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<b>TITLE</b>	<b>"METAREPRESENTATION" AND "INTERPERSONAL RELATEDNESS" AS EXPLANATIONS OF THE SYMBOLIC PLAY OF AUTISTIC CHILDREN</b>
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**"Metarepresentation" and "Interpersonal Relatedness" as  
Explanations of the Symbolic Play of Autistic Children**

**Submitted for the Degree of Doctor of Philosophy  
in Psychology**

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**Allan Skelly BA**

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## Summary

The purpose of this thesis is to examine whether the interpersonal relatedness approach or the metarepresentational (or "theory of mind") approach is a more adequate explanation of the symbolic play of children with autism. This was attempted first, by a comparative theoretical analysis of evidence presented in support of both theories to date, and second, by inclusion of affective and attentive variables in empirical studies of symbolic play in children with and without autism. The roles of affect and attention were crucial, because they are implicit in the interpersonal relatedness theory of symbolic development, but not considered at any length in the metarepresentational approach as it was originally proposed.

Current evidence in favour of both theories is presented in chapter 1. It was found that findings from studies of 'false belief' and symbolic play in autism suggest a 'cognitive deficit' (metarepresentational impairment), but there are also a number of 'affective' impairments which cannot be predicted by such a deficit. It was found that both theories do not have total empirical support.

Five empirical studies are presented in chapters 2-7. The influence of a musical stimulus on the symbolic play of children with and without autism is examined in chapters 2 and 4. It was found that more elicited symbolic play (which requires the child to produce the symbolic idea) was demonstrated by children without autism on the inclusion of a musical stimulus. The children with autism were not influenced by the music.

An attempt was then made to examine the role of affect and attention during symbolic play, by the development of a rating scale to measure perceived affective mood and attention-to-tasks, in chapters 3, 4, 5 and 6. The scale is used in chapters 4 and 6 to examine relationships of symbolic play, affective mood, and attention to tasks in children with and without autism. Some relationships between symbolic play, affect and attention were found in the children with autism. It was also found that over three occasions the children with autism looked at the experimenter less than the other children.

The possibility of a symbolic impairment in children with autism was examined in chapters 4, 6 and 7. Findings were inconsistent, probably because of methodological inconsistency between studies, and flaws in design. Because of this lack of consistent evidence it was not possible to support one of the theories and reject the other.

The general discussion (chapter 8) suggests that we cannot choose between the metarepresentational and interpersonal theories on the basis of current evidence, but there remain good reasons for both theories to continue to generate hypotheses to be tested. It is also suggested that recent integrative theories such as that of Baron-Cohen (1994) might bridge the theoretical opposition of Leslie and Hobson.

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**Declaration**

None of the material presented in this thesis has been submitted for any other degree.

"Melanie Klein (Klein, 1930) raised the problem of inhibition in symbol formation. She described an autistic little boy of four, Dick, who could not talk or play; he showed no affection or anxiety... There resulted a paralysis of his phantasy life and of symbol formation. He had not endowed the world around him with any symbolic meaning and therefore took no interest in it"

(Segal, 1988; p.163)



## Chapter 1

### **A Comparative Analysis of the Theories Explaining the Symbolic Play of Children with Autism**

#### 1.1 Introduction

The purpose of this thesis is to examine whether the metarepresentational (or "theory of mind") approach or the interpersonal relatedness approach is a more adequate explanation of the symbolic play of children with autism. A lack of symbolic (imaginative or pretend) play is a feature of the syndrome which is widely considered to be of key importance in understanding the disorder.

The two approaches to autism will be considered in depth. The first approach comes from cognitive neuropsychology, and is known as the "theory of mind" explanation. Central to this explanation is the *decoupler* performance model, proposed by Alan Leslie in 1987 as the means by which certain *representations* are 'decoupled' into symbolic *metarepresentations*. It will be seen that this approach is an information processing account of autism, described in computational terms.

The second approach is that proposed by R. Peter Hobson (e.g. 1990a, 1990b, 1993). This approach may be broadly viewed as 'social' although this is partially due to its contrast to the 'theory of mind' approach, and comes from the perspective of developmental psychopathology. Central to this approach is the concept of interpersonal relatedness which is argued to be non-computational and an essential dynamic in the development of language, thought and symbolic abilities.

Both of these approaches claim links between their respective key concepts (metarepresentation and interpersonal relatedness) and children's developing awareness of

the psychological states of other people. Therefore, it will be seen that research into symbolic play and research into awareness of others' mental states are related. However, this thesis is primarily concerned with the nature of symbolic play and how this differs for children with autism. Both theories consider this.

It will first be useful to define symbolic play, and autism as a syndrome, before examining the evidence for particular cognitive and affective impairments in autistic people.

Following evaluation of this evidence the theoretical bases for each particular approach are presented, with particular reference to how each approach explains symbolic play and the symbolic play of children with autism. Finally, some alternative approaches to autism are briefly considered.

## 1.2 What is Symbolic Play?

Fundamentally, symbolic play is behaviour which is simulative or non-literal (Fein, 1981), where the individual acts as if something were the case when in reality it is not (e.g. Leslie, 1987). Originally Piaget (1962) contended that symbolism emerges during the period of sensorimotor development as a distinction appears between the *signifier* (the present object or action) and the *signified* (the absent object or action).

There are developmental processes in symbolic play development which have been identified in the research, specifically *decentration*, which involves moving from the self as the agent of pretence to others as the agent of pretence (Lowe, 1975), *decontextualisation*, which involves moving away from realistic objects to produce pretence (Jackowitz and Watson, 1980), and *integration*, which involves the gradual inclusion of several play acts to form sequences (Fenson and Ramsay, 1980). All three of these phenomena reflect a child's growing awareness of the social world and creative independence.

Most authors agree that there is a social context to much symbolic play. This is highlighted by the work of Haight and Miller (1992) who engaged in a longitudinal study of symbolic play development in nine 'middle class' children in the United States. The children were observed in naturalistic settings from age 12 months to 48 months. The authors found that play occurred predominantly in interaction with others throughout the observation period. Whilst play was predominantly mother-and-child until 36 months, after 36 months play was equally mother-child and child-child. Both mothers and children initiated play, although it was the parents who tended to elaborate the play, and prompt new elements of play. It was also found that parents' talk was incorporated into the child's solo play. This study is important as it emphasises the difference between pretend play with a partner and solo pretend play.

The actions which themselves are pretended can be viewed as comprising different types. For example, Jarrold (personal communication) has examined *physical*, *emotional* and *social* symbolic play actions. Clearly these different forms of play might signify different cognitive processes. Jarrold's study shall be examined further when we consider the evidence for a symbolic play impairment in autistic children.

Symbolic play tends to become complex as development progresses. For example, Howes and Matheson (1992) examined the sequences in the development of competent symbolic play with peers, in 48 children aged 10-59 months. The pattern of play forms and the proportion of time in complex play patterns were found to relate to indices of social competence. The authors suggest that complex symbolic play requires available adult and peer interaction. Incidentally, they found that the 48 children, who attended a 'model' child care centre, showed symbolic play earlier and with greater complexity than 259 controls who attended minimally adequate child care centres.

A very important distinction is whether or not the child has the symbolic idea provided or whether they generate the idea themselves (*generative* symbolic play). Examples of non-generative symbolic play are *instructed* and *modelled* symbolic play; examples of generative play are *spontaneous* and *elicited* symbolic play (Lewis and Boucher, 1988). As can be seen in the studies of Lewis and Boucher (1995; 1988) we can have different expectations from children depending on the kind of play which is to be examined.

Therefore, symbolic play is an activity which occurs with increasing complexity, competence and independence on the part of the child. Physical, social and emotional symbolic play may be different in nature, as may be generative and non-generative symbolic play. Social interaction is an important part of symbolic play development. The symbolic play examined in this thesis shall be interactive, but mainly comprising physical play actions. It will also be non-spontaneous, although generative and non-generative play shall be contrasted. It is recognised that symbolic play has many other forms, but we

need to balance experimental control with the need for examination of play which truly represents the child's social-cognitive development.

### 1.3 What is Autism?

The first person to recognise autism as a syndrome was Leo Kanner (1943). Kanner reported 11 cases of autism in his original paper, and later suggested five features which could be implemented in diagnosis (Eisenberg and Kanner, 1956). These were: a profound lack of affective contact with other people; an obsessive desire for sameness; a fascination with objects; communication difficulties and poor use of language; and good cognitive potential. Kanner felt that the lack of affective contact was the central feature of the disorder, producing the other features.

The 'good cognitive potential' feature was based on Kanner's observations that children with autism *looked* intelligent and thoughtful, and that the children of his original 1943 paper tended to have intelligent, professional parents (Lewis, 1987). It is now widely believed that Kanner overestimated the likelihood that children with autism have good cognitive potential.

It has also been proposed that a lack of emotional contact with other people could not be the primary feature of autism. For example, Rutter (1983) has argued that the central problem in autism must be a cognitive deficit, because the lack of affective contact should not lead to the obsessional and communicative features. Rutter proposed a basic cognitive deficit, 'basic' in that it is fundamental to the syndrome of autism, and 'deficit' because cognitive abilities are not damaged by psychogenic factors.

Thus, the historical growth of cognitive approaches to the conceptualisation of psychological disorders has influenced the theoretical and empirical investigation of the nature of autism. Wing and Gould (1979), in a very thorough population study, produced

evidence that there is an association between low IQ and symptoms of autism. Increasing percentages of children showed symptoms of autism towards the bottom end of the intelligence scale, which might suggest a common cause for the 'social' and 'cognitive' elements of autism.

Both of the approaches presented in this thesis identify social delay in autism as a major defining feature of the syndrome. Even though most children with autism also demonstrate general intellectual delay, they show a specific delay in the awareness of the psychological states of other people, which is disproportionately poor in comparison to control groups with similar levels of general delay (e.g. Baron-Cohen, Leslie and Frith, 1985).

Current approaches have therefore come full circle in focussing on the social features of autism which Kanner considered central. However, the 'theory of mind' approach proposes that the inability of children with autism to 'metarepresent' the mental states of other people is due to an innate cognitive deficit or delay. In contrast, Hobson's approach actually suggests that the 'innate inability to form the usual, biologically provided affective contact with other people' (Kanner, 1943, p.250) can predict the propensity of people with autism to be 'asymbolic' and unable to perceive mental states of other people. This approach therefore challenges Rutter (1983) in that the underlying deficit of autism need not be 'cognitive'.

It is clear that children with autism do not engage in spontaneous symbolic play to the same extent as other children (e.g. Baron-Cohen, 1987). This can be accounted for by both cognitive and conative factors (the importance of conative factors is illustrated by Lewis and Boucher, 1988). Conative factors include a person's drives, will to act, and motivation (Oxford Medical Dictionary, 1984). At the risk of repetition, it should be again highlighted that there is a relation between poor spontaneous symbolic play, and the

inability to perceive the mental state of another person, in both theoretical approaches which are reviewed.

#### 1.4 Empirical Examination of the Social Impairments of Autism

Most authors consider that autistic people suffer primary impairments in social understanding, although autism also involves language disorder and a desire for sameness. The examination of different elements of social understanding has been quite a diverse activity, and several specific impairments seem plausible. These include symbolic play, 'theory of mind', reciprocal interactions with peers, joint-attention impairments, empathic understanding, emotional expression and emotion perception.

##### 1.4.1 Symbolic Play

Baron-Cohen (1987) examined the extent of the symbolic play of 10 children with autism (mean verbal MA<sup>1</sup> 29 months, mean CA<sup>2</sup> 97 months) in comparison with Down's Syndrome and mainstreamed<sup>3</sup> controls. The children with Down's Syndrome were matched to the children with autism via the British Picture Vocabulary Scale (BPVS). Play was observed with stuffed animals and wooden blocks, with toy kitchen utensils in a toy kitchen, and with play people. Play had to be produced spontaneously, without any help from the experimenter.

The types of pretence described by Leslie (1987; see below) were considered as symbolic play. No child in any group showed symbolic play with the play people. With the other toys, significantly fewer children with autism produced any symbolic play. However, Lewis and Boucher (1988) suggested that Baron-Cohen's language-matching procedure was flawed. The vocabulary of children with autism is generally more advanced than

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<sup>1</sup>MA=Mental Age

<sup>2</sup>CA=Chronological Age

<sup>3</sup>By 'mainstreamed controls' it is meant children who are either not seen to have special educational needs, or in the case of children not yet of school age, those not anticipated as requiring special educational needs provision.



other aspects of their language (Paul, 1987). This casts some doubt on the validity of Baron-Cohen's findings.

Ungerer and Sigman (1981) examined the symbolic play of sixteen children with autism (mean CA 51.7 months, mean MA 24.8 months). They demonstrated that a *structured* play situation produced levels of symbolic play that were significantly greater than in a free play situation, and they proposed that this was due to untapped potential for metarepresentation in children with autism. Later, Sigman and Ungerer (1984) included controls: in comparison with children with a learning disability and normal children matched for mental age, the number of symbolic acts was significantly lower for the group of children with autism in both conditions. So, while the symbolic play of children with autism could be improved by structuring the situation, it was still poorer than that of the controls.

Baron-Cohen (1987) criticised the work of Sigman and Ungerer on the basis that the play of the children in their study could reflect simple imitation, since defaulting participants had play modelled by the experimenter. However, Sigman and Ungerer did not explicitly design the experiment to look at symbolic play with the same emphasis as Baron-Cohen (1987).

In a study which specifically aimed to produce symbolic play, Lewis and Boucher (1988) compared fifteen children with autism (mean CA=132 months, mean MA 65/51 months) with normal and children with moderate learning disabilities, matched by expressive verbal ability on the Renfrew Action Picture Test. This test gives two age-equivalent scores, one for 'information' and one for 'grammar'. Spontaneous, verbally-elicited, and verbally-instructed play conditions were included. There was no significant difference between the groups' symbolic play in the spontaneous condition, though this may well have been due to the extremely low levels of symbolic play in this condition. The duration and quality of symbolic play was not significantly different in the elicited and instructed

conditions. The study is contentious in that Lewis and Boucher suggested that children with autism may suffer from impaired desire to use largely intact symbol structures.

In a reply to a criticism of Baron-Cohen (1990) who suggested that the children with autism may simply have been guessing, Lewis and Boucher (1990) demonstrated that the play of the children with autism in their study was surprisingly sophisticated. One child suggested 'London bridge, car fell in the water' when presented with blocks and a toy car.

Riguet, Taylor, Benaroya and Klein (1981) had also suggested that the optimal conditions for observing symbolic play in children with autism would involve structuring the test procedure. Riguet et al. used toys in both a spontaneous and a modelled condition. Ten children with autism (mean CA 120 months, mean verbal MA 30 months) were matched with control groups of children with Down's Syndrome and mainstreamed children. The children with autism played less in both conditions, and the authors note that the quality of their play was poorer. However, Baron-Cohen (1987) noted that only 'object substitution' and not 'reference to absent objects' or 'attribution of nonexistent properties' (c.f. Leslie, 1987) were considered 'symbolic' in this study, and so it suffers from a serious conceptual flaw.

Wetherby and Prutting (1984) examined symbolic play in the context of 'cognitive-social' abilities in four young children with autism (mean CA 114 months). A spontaneous play and a modelled play condition were included, and the authors had similar toys to those modelled 'around' to test for any generalisation of play. The symbolic play of the children with autism was shown to be poorer in quantity and quality than that of four mainstreamed children of similar linguistic ability. Curiously the authors do not comment on the generalisation ability of the children, nor are the two conditions compared to test for the effect of situation structure. On these grounds, and because of the small sample, the study is flawed.

With the significant exception of the Lewis and Boucher (1988) study, these results suggest that children with autism lack a competence in symbolic play skills. If one can assume that metarepresentation is indeed the underlying ability which allows the decoupling of representations from literal perceptions, then it would seem that there is indeed support for Leslie's (1987) thesis from research into symbolic play.

Lewis and Boucher (1988) included relatively able children with autism whose symbolic delays may well be difficult to detect with contemporary symbolic play tests.

Furthermore, the use of the Renfrew Action Picture Test may have selected very able children with autism, since their scores on this test are significantly lower than on tests of vocabulary and the comprehension of grammar (Jarrold, Boucher and Smith, 1993). Also, the anomalous result that the functional play of children with autism was worse than that of controls, whilst their symbolic play was comparable, can be accounted for by general floor effects in the symbolic play condition.

#### 1.4.2 'Theory of Mind'

Hobson (1984) addressed the question of perspective-taking in children with autism. Children with autism, controls with Down's Syndrome, and mainstreamed controls were included. Hobson devised a series of hide-and-seek problems, using three miniature pipe-cleaner figures. Also, the children were asked what one or two dolls could 'see' when placed at different angles to a multi-coloured cube. In fact the children with autism were comparable in the hide-and-seek tasks, and performed better than the children with Down's Syndrome at understanding the doll's 'visual perspective'.

In reporting the above study for the purposes of a review, Hobson (1993) notes John Flavell's (1974) point that a young child may be unable to represent to herself someone else's 'seeing' experiences, but still understand how to answer correctly the question "What am I (you, he) looking at?". This could be achieved by reconstructing it as "What

is on your side of the display?" Also, Hobson notes, Shantz (1975) has argued that visual perspective-taking is the least 'social' of a number of types of 'social inference'.

In fact, children with autism have no difficulty in understanding person permanence (Sigman and Mundy, 1989), visual perspective taking (Hobson, 1984; Baron-Cohen, 1989b), mirror self-recognition (Dawson and McKissick, 1984), gender recognition (Weeks and Hobson, 1987) or face recognition (Goode, 1985). However, Goode (1985) has noted that people with autism often use unusual strategies to recognise the faces of others.

Leslie (1987) proposed that it is the concept of a person's *mental* perspective rather than their visual perspective which might be deficient in autism. To test this understanding of cognitive or mental perspective (rather than visual perspective), Wimmer and Perner (1983) developed a simple test of understanding of *false belief* in others. False belief is a mental state which involves the belief that something is 'true' when in reality it is false. Two dolls, named Sally and Anne, have a basket and a box respectively in front of them. Sally is shown to place her marble into a basket. She then leaves. While she is away, Anne is shown to take a marble from the basket and place it out of view in her own box. When Sally returns, the experimenter asks, "Where will Sally look for her marble?" Two control questions which do not require understanding of Sally's false belief are also asked; "Where is the marble really?" and "Where was the marble at the beginning?" The scenario is repeated, but with the marble hidden in the experimenter's pocket.

Baron-Cohen, Leslie and Frith (1985) conducted this procedure with 20 children with autism (mean CA 132 months, mean MA 66 months, controls with Down's Syndrome who had significantly lower verbal MA and mainstreamed controls. Eighty-five percent of the mainstreamed controls and 86% of the children with Down's Syndrome indicated that Sally would look in her basket, whereas only 20% of the children with autism did so.

The same authors (Baron-Cohen, Leslie and Frith, 1986) applied understanding of mental perspectives in others to children's understanding of depicted storylines. Some of the stories in this study showed mechanical events (e.g. a man rolling a rock down a hill), whereas others involved social routines (e.g. a girl buying sweets from a shop). Still others involved something happening in which a main figure in the story did not perceive that an event had happened, only to find out and show a surprised expression. Similar groups to the 1985 study were included. The controls were almost all proficient at ordering the storylines no matter whether they involved mechanical events, social routine, or false belief in the depicted figure. The children with autism were not proficient at sorting the latter type of story. Also, the children with autism did not use mental state terms such as 'want', 'know', and 'believe', to explain in their own words what had happened in the stories.

Baron-Cohen (1989a) reports three further studies which show a similar pattern of specific problems in children with autism. In the first study, pairs of dolls were shown to children with autism and controls. The child would be told, "This is Sam. He likes biscuits. He is hungry, so his mother gives him a biscuit. This is Kate. She is hungry, but she is all alone. She is thinking about a biscuit." Then several questions were asked, along the lines of "Which child can eat the biscuit?", as well as "Which child can touch the biscuit?". An example of a control question was "Which child was given the biscuit?"

The children with autism performed significantly less well on questions like the first two presented above, which needed some representation of the mental perspective of the characters. Only a quarter of the children with autism scored at least seven out of eight questions correctly. In contrast, over three-quarters of controls could do so.

In the second study reported by Baron-Cohen (1989a) the same subjects were required to answer questions about the brain and the heart, in terms of their location and function. Both groups answered appropriately about the location and function of the heart, and also

about the location of the brain. However, only one-quarter of the children with autism replied that the brain was for 'thinking' or any other mental function. Instead, they were more likely to refer to the brain in terms of co-ordinating behaviour - for example, 'It makes you move'. Three-quarters of controls spontaneously referred to the function of the brain in terms of mental functions.

The third study reported by Baron-Cohen (1989a) involved the children with autism and controls distinguishing between appearance and reality. In one case, the children were shown a plastic chocolate, and asked, "What is it?". All of the children said it was a chocolate. They were then invited to handle the chocolate, and asked, "What is it made of?". The children replied that it was made of plastic.

The 'appearance' question was "What does it look like?", and the 'reality' question was "What is it really?". Only a minority of the children with autism (one third) could make the correct distinction, whereas a majority of the controls (two thirds) could do so. Indeed, many of the children with autism attempted to eat the plastic chocolate, in spite of being aware that it was made of plastic. Baron-Cohen (1989a) suggests that children with autism do not have 'the concept of their own knowledge' which, he suggests, is required to conclude that the chocolate only appears to be real. This concept Baron-Cohen holds to be metarepresentational.

More recently, Sodian and Frith (1992) examined the ability of children with autism to understand deception. Sodian and Frith argue that deception requires some capacity for inference about the mental states of others. They designed a task where the child was given a chance to 'sabotage' the efforts of a nasty wolf-character doll. Also, the child could 'thwart' the doll by influencing its inferred beliefs. There was also a condition where a 'nice' doll would ask for help, and the child was able to actively 'help' the doll by volunteering information.

The child was given a piece of confectionery and asked to hide it in a box. They were then told by the experimenter to help the 'nice smartie friend' or to prevent the 'nasty smartie eater' from eating it. In the 'sabotage' condition there was a key to lock the box, and the child was asked whether they wanted to lock the box or leave it open. In the 'deception' condition there was no key, and the child had the task of telling the puppet whether or not it was worth walking around to the lock to see if it was open. The puppet asked "Is the box locked or is it open?" and the experimenter then said, "What do you want to say? Do you want to say it is locked or do you want to say that it is open?". If the child lied to the nasty puppet or told the truth to the nice puppet, then the child would be given a smartie. They would not be rewarded if they told the truth to the nasty puppet.

When scores were adjusted to allow for subjects' mental ages, it was found that the groups were similar in performance in the sabotage condition, but that the children with autism were less likely to deceive the nasty puppet whilst telling the truth to the nice puppet. However, there are potential difficulties in interpreting these results. The children with autism may have perceived correctly the 'mental states' of the nasty puppet. The problem is as follows. If the child had perceived the mental state of the experimenter (who obviously knows everything that is happening), except for the subtlety that it is 'okay' to lie in this special 'playful' situation, then it is unclear whether (1) the child does not deceive the nasty wolf-character because her capacity for metarepresentation is delayed, or (2) the child does not deceive the nasty wolf-character because she has been told previously not to lie. Indeed, Hobson (1993) argues that failure to perceive the 'playful' nature of certain situations may retard the child's propensity to act as if a particular situation is 'not-for-serious'. That is to say, the child with autism may lack the capacity to metarepresent the 'nasty' intentions of the wolf character, or equally as feasibly, the child may lack an 'emotional' ability which flags some affective experiences as 'serious' and others as 'not-for-serious'.

In spite of this possibility, it seems that these results are confirmation that deception is a problem in children with autism and that this may be related to the failure to perceive the mental states of others.

These studies are methodologically elegant and seem to yield highly reliable results. We might suppose on the basis of the above results that a cognitive impairment exists in autism which encapsulates both symbolic play and understanding of other people's mental states. In fact Baron-Cohen (1989b) suggested that theory of mind impairment in autism is a case of specific developmental *delay*. Baron-Cohen recruited children with autism from his previous experiments who had passed the Sally-Anne false belief tasks. With these children, he applied a complex false-belief story which involved a doll inferring what another doll was inferring. This was referred to as a 'second-order' false belief task. None of the children with autism could successfully infer the second order false belief of the first doll. Baron-Cohen's conclusion was that where children with autism do develop some metarepresentational ability, it remains relatively unsophisticated.

#### 1.4.3 Interaction with Peers

Much research has been completed by Lord (1984; Lord and Garfin, 1986; Lord and Hopkins, 1986) into the success of peer relations in children with autism. Lord (1984) utilised specially-trained mainstreamed peers to elicit social behaviour in six children with autism aged around ten years, with the use of facilitatory toys.

First, the children with autism were left to interact together spontaneously. Fifteen minutes of this initial interaction were analysed. It was shown that whereas they spent about 25% of the time physically oriented towards each other, no child made more than four initiations or responses in the whole 15 minutes. When the peers were introduced, only one child who had autism made any initiations, and the children with autism responded to less than 25% of the peers' attempts to engage them in play.



Several daily 15-minute sessions where peers were included were analysed, with a gradual increase in the responsiveness being reported in the children with autism. Some even sustained responses beyond a single signal to engage in play with the peer. However, they continued to demonstrate relatively little eye contact during interaction, language use, and the use of objects in non-stereotyped ways.

Lord (1984) noted that success was more likely where the children with autism could perceive easily what the peer was asking them to do. She concluded that structuring situations improves the number of prosocial behaviours demonstrated.

McHale (1983) also demonstrated that facilitatory toys such as tricycles can improve the amount of time which children with autism spend in peer interaction from 25% at baseline to 75% of the time in their final observation. However, in reviewing this study of peer interaction in children with autism, Howlin (1986) pointed out that children with autism are unlikely to initiate interaction at any point. Also, they are unlikely to make the crucial step of reinforcing peers who interact with them, nor are they likely to learn and generalise the skills experienced in such interactions.

Children with autism clearly do not engage in reciprocal interactions with peers to the same extent as other children. Such peer interaction was proposed by Haight and Miller (1992) to increase in combination with symbolic play after 36 months, in the course of normal development.

#### 1.4.4 Joint-Attention

The one-year old child shows an emerging capacity for sharing each others' feelings and objects. By 'sharing', it is meant that the two individuals, infant and carer, show some attention to each others' emotions and direction of gaze.

A study by Wetherby and Prutting (1984) has already been mentioned as providing limited support for a symbolic play impairment in autism. They examined four children with autism and four mainstreamed controls. Eight situations were analysed where communicative exchanges to the experimenter were prompted. For example, the experimenter would eat food where the child could clearly see them (thus prompting a communication from the child about eating), or the experimenter would read a book which the child owned, and so on. Each of the children with autism would manipulate the experimenter's behaviour to get the food, but attention was not sought as an end in itself. None of the children with autism directed the adult's line of gaze to the object. They did not 'show off', label objects, or acknowledge the adult as a reciprocal interacting individual. It seemed they were merely objects which could be acted on in certain ways in order to provide reinforcement.

Loveland and Landry (1986) aimed specifically to examine the sharing of emotions and objects in children with autism, and assigned controls with a specific language delay matched for both verbal and non-verbal intellectual function, as well as mainstreamed children. The children with autism were aged between five and 13 years. Each child was videotaped playing with one of the experimenters in a playroom, which had freely-available toys in it, as in the study by Lord (1984). In free-play situations the child's attempts to initiate interactions were recorded. Also, the experimenter engaged the child in structured scenarios. First, the child would be required to either produce or understand personal pronouns ("I've got the [toy]") or demonstratives ("This [toy] is over there"). Alternatively, the child was required to respond to attention-directing gestures such as pointing, showing, gaze-shifting, or tapping an object. As a further alternative they could be required to combine object-directing behaviours with language ("That is a [toy]"). Second, the experimenter would attempt to elicit attention-directing 'requesting' behaviours from the child, by placing attractive objects or food just beyond the reach of the child.

It was found that the children with autism were less likely to respond appropriately to language and gestures which the experimenter had used to direct their attention. Also, the children themselves were less likely to produce pointing and gestures especially in the free-play (non-structured) situations. This finding echoes the symbolic play research which also highlighted the importance of structured situations in improving the social behaviour of children with autism, but not to 'normal' levels. The children with autism in this study also demonstrated infrequent use of the terms 'this/that' and 'here/there'. In all groups, an association between language abilities and the use of joint-attention gestures was found. Possibly, there is a relationship between these domains of function.

Hobson (1993) has reviewed the research into joint-attention behaviours in children with autism carried out at UCLA (e.g. Mundy, Sigman and Kasari, 1990; Mundy, Sigman, Ungerer and Sherman, 1986, 1987; Sigman, Mundy, Sherman and Ungerer, 1986). In this series of studies, young children with autism (between three and six years) were tested alongside children with general intellectual delay and no autism. The authors adopted the Early Social Communication Scales (ESCS; Seibert, Hogan and Mundy, 1982) in order to assess joint-attention skills. The child and experimenter would sit facing each other across a table. A set of toys, including a hat, a comb, a book, a ball, a car, five small wind-up mechanical toys and five hand-operated toys were 'on view' but out of the child's reach. Colourful posters were on the walls of the room. The toys were presented one-at-a time by the experimenter, who would also look at the wall posters every so often. The experimenter would also engage the child in physical social games such as tickling, turn-taking activities such as rolling a car back and forth, and taking turns with a comb or hat. Verbal interactions were kept to a minimum.

The sessions lasted for 25 minutes each, and were videotaped to be analysed for three categories of behaviour: (1) social interaction; (2) joint-attention; and (3) requesting behaviours. Social behaviour was defined as the child's capacity to elicit attention or

physical contact and to engage in turn-taking with the experimenter. Joint-attention was seen to entail the use of gestures which were intended to direct attention to an object or event. Requesting behaviour was seen to entail the actions and gestures of the child which were intended to gain aid in obtaining objects and events. The joint-attention category included pointing, showing and also alternating looks between the particular toy and the experimenter's face.

A relative poverty of joint attention behaviours was reported only in the children with autism. For example, eye contact was relatively common during tickling, and relatively common when a toy was moved out of reach-but there was little of what Hobson (1993) calls 'referential looking' when both the child and the experimenter were engaged with a toy.

Hobson (1993) proposes further that this lack of joint attention to objects in children with autism represents the lack of an important *relationshiptriangle* which is necessary for a normally-developing symbolic life. In order to build concepts of the symbolic meaning of objects and events, one needs to be aware that one has 'I-Thou' relations with other people. One's symbols and language are, at least in part, socially-constructed. The 'relatedness triangle' is primarily built from the relationship of the infant to the other, and secondarily from the relationship of both to the referent (the symbolic object or event). Thus, Hobson's theory predicts that a failure in interpersonal relatedness 'triangle formation' (infant-other-referent) can lead to impairments in symbolic and language abilities. This theory shall be further elaborated below.

A test of the prediction that linguistic ability depends upon adequate social interaction skills, is whether there is any relationship of joint-attention skills to the development of language in children with autism. If children with autism who are relatively able in language use (and the symbolic quality therein) are very poor in joint-attention skills, then the theoretical position that a relatedness triangle is crucial for both language and symbolic

development is untenable. However, this is not to say that nonsymbolic elements of language (such as vocabulary) could not develop normally.

We have already seen that Loveland and Landry (1986) did note an association of the use of joint-attention gestures and language ability. Mundy et al. (1987) reported that with the sample of children with autism, individual subjects' abilities to comprehend and use protodeclarative gestures were correlated with measures of language ability and symbolic play.

In addition, Mundy et al. (1990) examined a group of fifteen children with autism (mean CA about 4 years) and equivalent groups of children with general intellectual delay and mainstreamed children. The study lasted a period of one year. In contrast with controls, the language development of the children with autism could be predicted by initial gestural non-verbal joint-attention skills, but not by initial language scores or IQ. Thus, there seems considerable evidence for both the importance of coordinated attention of children with autism themselves in the context of a dyad with another person, and for Hobson's postulate of a relatedness triangle which links affective experience to symbolic/linguistic ability.

Mundy, Sigman and colleagues identified key aspects of personal relatedness which are specifically delayed in autism - notably protodeclarative as opposed to protoimperative gestures, failure to respond to others' bids for joint visual attention, certain specific forms of eye contact such as prolonged 'referential looking', and mutual gazing. These would seem to be convenient for a theory that autism involves social impairment first and symbolic impairment second.

However, Baron-Cohen (1993a) found that protodeclarative gestures were not impaired in autistic children when the pointing was made for reasons which were not purely social. He argued that Hobson is wrong to assume that the impairment is social and therefore not

symbolic in the first instance (Baron-Cohen, 1993b), instead proposing that a symbolic impairment underlies the failure to engage in purely social protodeclarative pointing. Indeed, more recent work by Baron-Cohen (1993a, 1993b) has demonstrated that joint-attention impairments are compatible with a cognitive approach. At this point we are in danger of entering a key theoretical debate, before we have finished examining the impairments of autism. The theories of Hobson and Baron-Cohen will be further discussed below.

#### 1.4.5 Empathy

It is developmentally significant for an individual to recognise that the feeling of another individual is expressed through their emotional expressions. From this perception the child applies their own self-knowledge (e.g. the experience of pain) to the mental state of the other. Such *empathy* is an important element of interpersonal relations. A behavioural measure of this empathy might be the interpersonal co-ordination of affect.

Again, UCLA has been at the heart of research into empathic behaviours in autism. From structured tests of joint-attention Sigman, Mundy and Yirmiya (1990) assessed how relatively young children with autism (three to six years), and controls with general delay and no delay, express feeling towards the experimenter in 'joint-attention' and 'requesting' conditions. The subjects had their facial expressions coded second-by-second for a total of eight minutes, using the Maximally Discriminative Movement Coding System (Izard, 1979).

The children with autism demonstrated uniformly low numbers of affect displays in both conditions, but least of all in the joint-attention condition. This was where mainstreamed controls smiled the most. A lack of affective sharing is apparent in autism on the basis of these results at least.

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Other studies corroborate this result. Snow, Hertzog and Shapiro (1987) analysed the interactions of ten children with autism, and ten children with general intellectual delay, in interaction situations. The situations were with (1) the child's mother, (2) a child psychiatrist, and (3) a nursery school teacher. Twenty 15-second excerpts of videotaped interaction were coded with each partner. Smiles and laughter were considered affective displays. Whereas most of the positive affect displayed by controls was other-directed, the children with autism tended to demonstrate rare, directionless displays of positive emotion. They seemed relatively self-absorbed. They showed selectively fewer other-directed smiles at the psychiatrist although there was a small but significant amount of other-directed affect displays towards the child's mother and the nursery school teacher.

More recently, Dawson, Hill, Spencer, Galpert and Watson (1990) examined 16 children with autism and 16 mainstreamed controls matched for receptive language age. There were three conditions: spontaneous free-play with a caregiver, a structured situation where the carer asked the child to aid him/her in putting away toys, and a face-to-face encounter at which a snack was consumed. In line with Hobson's (1991b) concerns about the comparability of children with autism and children with no intellectual delay, it should be pointed out that there is some doubt about whether the results which follow represent *autism-specific* features.

However, with some caution in mind, the results can still be considered. Although the children with autism did not show fewer or shorter gazes at the experimenter's face, or fewer or shorter smiles during the snack, they were unlikely to combine their smiles with eye contact. Also, controls smiled in response to their mother's smile, whereas only three children with autism were recorded as doing so. Dawson et al.'s (1990) study is also interesting because it extended to the carer. Carers of children with autism were less likely than those of controls to smile in response to their child's smile. This suggests that the social impairments seen in autism extend beyond the child and into the behaviour of



significant others. This perhaps explains why Kanner (1943) reported that parents of 'autistic children' seemed aloof and detached.

Children with autism do not demonstrate coordinated emotion appropriate to interaction with another person. Also, carers of children with autism may not show affect in response to the affective displays of their children, because it is not accompanied by visual contact.

#### 1.4.6 Emotional Expressiveness

The *vocal and facial expression* of emotion has also been examined in children with autism. Ricks (1975, 1979) made audio tape-recordings of six three- to four-year-old non-verbal children with autism, as well as six non-verbal children with general intellectual delay, and six normal infants, aged around eight to 11 months. Four situations involving emotional expressiveness were recorded: 'requesting' a meal at a hungry time; 'frustration' elicited by withholding the food for a few moments; 'greeting' when the children first saw their mothers on waking, and 'pleased surprise' when the child was presented with a novel stimulus such as a balloon.

The carers of the children were presented with audio tape recordings of their own child, two other children of the same group, and a child from another group. For example, a carer of a child who had autism was asked (1) to identify the context of each vocalisation, (2) to identify their own child, and (3) to identify the child who did not have autism. Then, the carer was asked to discriminate their own child from the other six children with autism.

With normal infants, carers could easily understand the non-verbal message, but they could not discriminate their own child. Carers of children with autism could discriminate their own child, the contexts, and they could discriminate the child who did not have

autism. They could not discriminate the contexts of the children with autism who were not their own. It seems from these results that the relationship of the child with autism and the carer is idiosyncratic in terms of vocal expressions of emotion.

The study of the *facial* expression of emotion in autism brings us once again to the UCLA group. Yirmiya, Kasari, Sigman and Mundy (1989) analysed excerpts of toy presentation, 'song and tickle' game play, turn-taking, and a balloon-blowing game. Children with autism, children with general intellectual delay, and mainstreamed children were included. Again, Izard's (1979) coding system for the facial expression of emotion was utilised.

The children with autism were more 'flat' or 'neutral' in their facial expressions of emotion than controls. Also, individual children with autism demonstrated a wide variety of emotions which were not displayed by any of the other children. Yirmiya et al. (1990) suggest that these expressions were inappropriate, incongruous to the expressions of the experimenter, and were often 'blended' curiously. For example, anger expressed with fear, or anger with joy.

Obviously, these comments could say more about the authors' experience of the children than the nature of the children's affect itself. However, the person who perceives the emotion is as much a part of interpersonal interaction as the person displaying the emotion.

Further evidence of the differential expression of facial emotion in children with autism and controls has been provided by MacDonald et al. (1989). In their study, judges were asked to rate the facial and vocal expressions of emotion in children with autism, and in controls, who had been specifically asked to display certain emotions. This required that the children be quite high-functioning. Expressions produced by children with autism were rated as more 'odd' than those of controls. Therefore, it seems that children with

autism are not perceived by others to demonstrate emotions 'normally'. One issue which will be taken up later in this thesis is whether there are within-subject differences in the perceived emotional state of children with autism as well as the between-group differences reported here.

Without knowing whether children were diagnosed 'autistic' or not, judges were able to identify the 'abnormality' of the expression of the children with autism. Nevertheless, Ricks' work demonstrates that at least to some extent, carers attempt to 'tune in' to the uniqueness of their own particular child. The development of autism would therefore seem to be 'dynamic' in the sense that there are developmental implications of having autism both for the child and for significant others.

#### 1.4.7 Emotion Perception

Early work by Langdell (1978) had demonstrated that children with autism do not tend to recognise the faces of familiar peers by the upper regions of the face, unlike intellectually delayed controls and children in mainstreamed education. Instead they made more errors, and the younger autistic children tended to utilise the lower regions of the face. Langdell (1978) concluded that in autism, there may be an impairment in the perception of mouths and eyes which affects processing of emotional communication.

Following on from this original work, the perception of emotion by children with autism has been investigated by Hobson and colleagues (e.g. Weeks and Hobson, 1987; Hobson, Ouston and Lee, 1988, 1989), as well as other authors (e.g. Fein, Lucci, Braverman and Waterhouse, 1992; Braverman, Fein, Lucci and Waterhouse, 1989; Prior, Dahlstrom and Squires, 1990). Hobson (1993) points out that differences between groups of children with autism and controls have often been quantitatively small, and occur less often when subjects are matched for verbal abilities. This is not the case when subjects are matched for non-verbal intellectual level. Hobson (1991b) examines these

problems at length. However, he maintains that methodological issues aside, children with autism often demonstrate poor perception of the emotions of other people, or at least do not attend to the emotions of others with the same salience as other children.

Perhaps the definitive study of the perception of emotion in children with autism is that conducted by Weeks and Hobson (1987). Fifteen children with autism were compared to an equal number of children without autism who had general intellectual delay, matched for verbal ability. The task involved sorting 16 photographs according to whether they matched presented 'standard' photographs. The standard photographs differed (1) by the sex of the person, (2) by the type of hat worn, and by (3) emotional expression. Whereas 10 of the normal children sorted the photographs by the emotional expression of the person in the photograph before they sorted by the type of hat worn, only three of the children with autism did so. Nine of the children with autism sorted by the type of hat worn by the person in the photograph first, compared to five of the normal group. Furthermore, even when specifically instructed to sort by facial expression of emotion, only four of the nine children with autism who had not sorted by emotional expression spontaneously could sort at least 13 of the 16 cards correctly. All 15 of the controls had sorted by emotional expression without being told to do so.

Weeks and Hobson (1987) concluded that there is support for the hypothesis of poor perception of emotion in children with autism. This was not necessarily a matter of poor competence, since the majority of the children with autism could sort by emotional expression when specifically instructed to do so. This research seems to demonstrate that many children with autism are relatively inattentive and insensitive to emotional expression in others.

It is possible that children with autism may pass on test items requiring the discrimination of emotional stimuli by using 'non-emotional' perceptual or 'cognitive' strategies. In order to examine this possibility, Hobson, Ouston and Lee (1988) employed four

'standard' photographs placed in a semicircle, which differed either by emotional expression or by the identity of the individual portrayed. Then the subject was presented with new photographs in sets of four. There were two tasks. First, in the 'emotional' task the subject had to sort the pictures of the different individuals by the equivalent emotional expression on the standard photograph. Second, in the 'identities' task the subject had to sort the sets of photos which were presented showing the same individuals as in the standard photos, by their identity. In this task photos showed a neutral affective tone.

To test for a 'non-emotional' perceptual strategy which may have been used by the children to answer correctly, the two tasks were repeated, but first the faces on the cards had blanked-out mouths, then they had blanked-out mouths and foreheads. In this way the authors hoped to partial-out any effects of perception by recognition of simple face changes, that is, perception not of emotional state but of emotional cue.

The groups scored equally in sorting the full faces of the different people according to emotional expression, and were equally capable of sorting the identity of the people in the photos. This seems to stand against the findings of Weeks and Hobson (1987). However, in the 'identities' task the performance of the subjects declined with more facial features being blanked-out. The groups differed considerably in the 'emotions' task in this regard. The children with autism showed a more abrupt decline in performance. This suggests two things. First, abnormal emotion perception is a feature of autism. Second, children with autism may use non-emotional perceptual strategies to understand how to identify an emotional state, but not in an interpersonal, qualitative way which transcends the perception of individual facial features.

In a further twist to this study, another condition was included. The standard photos were presented upside-down, with the tasks the same as described above. The control subjects

found it increasingly difficult to match emotions across identities, with the additional disruption to the normal processes of face recognition.

In the children with autism, performance was superior to that of the control group, in both types of matching, identity or emotion. Thus it seems clear that the normal processes of facial recognition are not used by children with autism. However, as Hobson (1993) points out, this may mean also that the identities task is an invalid control procedure.

As a post-script to these studies, Hobson, Ouston and Lee (1989) allowed children with autism, children with intellectual delay, and mainstreamed children to 'free-respond' to sets of photos and sounds, some of which were 'emotional' faces and voices, some of which were 'non-emotional' objects and sounds used to serve as a control condition. Once again, children with autism were poor at naming 'emotional' sets of photos and sounds, but were not poor at naming non-emotional sets of photos and sounds.

### 1.5 The Theories Explaining the Impairments of Autism, Specifically Symbolic Play

The theories which describe the impairments found in the research described above are not limited to the two presented here. However, there are strong reasons for contrasting these two theories. First, there is clear water between them. The metarepresentational approach includes a formulation of a basic symbolic impairment which (the authors would hope) accounts for the other social impairments which can be observed. In contrast, the interpersonal approach suggests that first comes interaction - all symbolic life is secondary. This issue is one of causation, and proof of causation of a particular factor has been very difficult to establish with certainty in autism.

Second, the theories represent two traditions in psychological research; the cognitive psychologists and the developmental psychopathologists influenced by psychoanalytic descriptions of development. It may be that there is more common ground to be found in the evidence, than the historical opposition of these movements would lead us to believe.

## 1.6 Explaining the Social Impairments of Autism: The Metarepresentational Theory

The term "theory of mind" was first used by Premack and Woodruff (1978). They justified their choice of terms as follows:

"In saying that an individual has a theory of mind, we mean that the individual imputes mental states to himself and to others (either to conspecifics or to other species as well). A system of inferences of this kind is properly viewed as a theory, first, because such states are not directly observable, and second, because the system can be used to make predictions specifically about the behaviour of other organisms" (p.515)

Leslie (1987) suggests 'theory of mind' as the means by which children come to represent the mental world of others within their own subjective minds. He suggests that the ability to pretend is facilitated by a child's capacity for *metarepresentation*, which is the mechanism by which 'symbols' of the environment are abstracted into thought (e.g. memory). Pretence allows the individual to imagine him/herself as another person, leading to an appreciation of mental states in others.

How does the metarepresentation mechanism work? There should first be some discussion of the nature of representation and metarepresentation. Leslie (1987) described the ability of the child to metarepresent as a watershed ability which appears early in childhood. This is a development which is derived from the person's ability to represent the environment perceptually. Perceptual representations are not sufficient for pretence, because they are faithful reproductions of the literal information which enters the senses. Leslie named these *primary representations* which cannot in themselves allow for the double knowledge required for pretence. By 'double knowledge' (McCune-Nicholich, 1981) I am referring to the quality of pretence whereby the individual 'knows' that they are acting 'as-if' something were true, even when they know it is not.



In Leslie's model, representations must be 'quarantined' from primary representations for pretence to occur, because trying to act as if primary representations were not true would involve too much literal information for the individual to function. When this 'quarantining' has occurred, the individual achieves *metarepresentation*; the separation of representations avoids contamination from primary, perceptual input. In saying a metarepresentation is 'decoupled', Leslie is saying that the pretend context is removing the person's behaviour from 'normal' input-output relations, i.e. there may be a behaviour which could not be predicted from environmental variables.

There are three basic types of metarepresentation in Leslie's model: (1) object substitution (deviant reference), (2) Attribution of properties (deviant truth) and (3) imaginary object production (deviant existence).

There are also three properties of *mental state expressions* which correspond to these pretences. Mental state expressions are terms such as *believe*, *expect* and *want*. The three properties are:

- referential opacity. One cannot infer other knowledge from the particular expression. For example, 'Sarah-Jane believes John Major lives at No.10 Downing Street' does not necessarily correspond to 'Sarah-Jane believes that the prime minister lives at No.10 Downing Street'.
- nonentailment of truth. For example, 'John believes the cat is white' does not necessarily correspond to the cat being in truth white.
- nonentailment of existence. For example, 'John believes the king of France is bald' does not necessarily imply there is a king of France.

'Mental state expressions' are suggested to be key elements of the perceived notions of others' minds. Leslie (1987) suggests that these properties of 'mental state expressions' correspond to the basic types of pretence.

The communication and perception of mental state expressions are further suggested by Leslie to be indicative of the existence of 'Theory of Mind', the generalised notion of a person's knowledge of the mental states in others. Leslie contends that pretence is..

'..actually a primitive manifestation of the child's theory of mind and requires mastery of exactly the same logical structures as understanding mental states.' (cited in Wimpory and Chadwick, personal communication)

Leslie (1987) asserts that pretence may be regarded as an information-processing activity which occurs in real-time. Also, it is suggested that the capacity for metarepresentation is observed relatively early, at around 18 months. However, since this seminal paper important refinements have been made to this theory.

Josef Perner (1991) suggests that 'primary' representations of the world are single, constantly updating models of objects and events. The child must transform primary representations into *secondary* representations, this becoming possible around 11 months. These secondary representations involve multiple models of the world; that which the child perceives, and that which the child infers, which may be beyond direct perception.

It should be noted that Perner (1991) calls this 'Acting-as-if' rather than metarepresentation or symbolic ability (which he describes as a later ability, appearing at about 4 years). For example, the child will infer that a toy is underneath a cloth when s/he watches it being hidden. Leslie's interpretation is that this involves the child *metarepresenting* the object; Perner's is that the child *acts-as-if* the object can still be seen. The difference is that the child does not explicitly understand the alternative

representations, which is why the preschool child may make a number of failures in terms of certain tasks which seem easy to the adult observer. For example, the child may often fail to infer when another individual has a belief which needs updating (in step with changes in the situation) in order to be true, or that a hidden photograph will become out of date when the scene changes.

From Leslie's model, abilities of pretence should predict 'theory of mind' ability. The key 'theory of mind' exponents suggest that autism is a failure of these individuals to metarepresent (Baron-Cohen, 1988, 1989a, 1989b, 1991; Leslie and Frith, 1990; Leslie, 1987, 1988). A *cognitive deficit* model of autism, based on Leslie's model of representation and metarepresentation, involves the idea that the child who has autism cannot decouple metarepresentations from primary representations. Representations do not become divorced from the literal representations into metarepresentations, and so the child cannot develop the 'dualistic' concept of potential play objects. As a result, the child's symbolic play is impaired, whereas their non-symbolic play is relatively unimpaired. *Manipulative* play does not involve any metarepresentation; that is, the play is consistent with the physical attributes of the object. Similarly, *functional* play can be identified as a separate category of play, which does not require metarepresentation except in terms of perceiving a miniature object as representative of a bigger object. An example of this is the toy car being pushed along the carpet.

Autistic children seem to lack an understanding of mental states in others and show limited symbolic play, as we have seen. Perner's theory, coherently presented in *Understanding the Representational Mind* (1991), does not require any necessary link between symbolic play and understanding of mental states in others. Baron-Cohen (1987) found that only 20% of children with autism would engage in spontaneous symbolic play. Similar consistent results have been found in studies of false-belief understanding in children with autism. This would seem to favour Leslie's (1987) thesis to Perner's (1991) thesis.

However, as we have seen in the symbolic play research, more symbolic play can be elicited or instructed or modelled in autistic children, although it has not been demonstrated that performance on theory of mind tests improves in this way. Perner (1993) believes we should rethink the metarepresentational theory because of this. His objections shall be examined in detail below.

#### 1.6.1 How does the 'Theory of Mind' Approach Account for Symbolic Play?

In Leslie's (1987) theory, symbolic play is simply an early behavioural manifestation of metarepresentational ability. It is dependent upon the biological integrity of the brain, and not dependent on interpersonal interaction in order to develop. Although within this theory different metarepresentations might be expected to be learned in their socio-emotional contexts, a cognitive structure capable of processing information in symbolic ways is innately specified.

Frith (1992) conceptualises autism (and dyslexia) as a cognitive deficit in the mind caused by a biological deficit in the brain. Frith suggests that there might be several root biological causes of autism, but brain abnormalities are narrowed into a common pathway, and form a cognitive deficit (poor metarepresentation), resulting in the core difficulties of poor socialisation, communication and imagination. Poor symbolic play behaviours are representative of the poor imagination coming directly from the cognitive deficit. What evidence exists for the presence of an identifiable biological deficit in the brain?

For some time, it was thought that autism must involve some type of left-hemisphere dysfunction, because autism was conceptualised as a disorder of communication (Rutter, 1978; McCann, 1981; Prior, 1979; Ricks and Wing, 1976). More recently, reviews such as that of Fein, Lucci, Kaplan and Waterhouse (1984) and Bishop (1993) have suggested that "we are still a very long way off from understanding how brain damage or dysfunction can cause such a distinctive pattern of symptoms" (Bishop, 1993, p.279).

Damasio and Maurer (1978) suggested that autism is a disorder of the mesolimbic system and associated frontal lobe areas. This has not been confirmed or refuted since limbic structures project into many neocortical areas of the brain. The manyfold functions of limbic structures defy neurological understanding by way of their great complexity. This possibility aside, there is little agreement as to how abnormalities identified in children with autism relate to the evidence of cognitive and emotional impairments in autism (for reviews of the evidence in MRI and CT studies, see Coleman and Gillberg, 1985; Reichler and Lee, 1987). One area of research which does show some consistency despite being a theory in infancy is the study of the neocerebellum conducted by Eric Courchesne (e.g. 1991). This will be discussed later as it has more significance for the second major theory reviewed in this thesis.

There is strong empirical evidence for some degree of 'cognitive' disorder in autism. However there has been, until recently, a lack of consistent evidence from neurobiological studies that cognitive dysfunction in autism has a basis in brain damage (although it might be suggested that neurotransmitter depletion or developmental cortical malformations are responsible; Bishop, 1993).

Recently, Baron-Cohen (1994) has suggested that a three-node circuit exists between the superior temporal sulcus, the orbito-frontal cortex, and the amygdala. He writes that there is evidence of a SAM (Shared-Attention-Mechanism) which is faulty in autism, as well as a ToMM (Theory of Mind Mechanism) and an EDD (Eye Direction Detector). Any breakage in the circuit can result in autism according to his theory. Baron-Cohen (1994) also mentions a fourth component, the ID (Intentionality Detector) but the location of this component in the theoretical system is as yet unspecified.

Baron-Cohen's *Model of the Mindreading System* is certainly plausible. In support of the model, Baron-Cohen et al. (1994) have examined the pattern of brain activity shown by

12 adult volunteers during recognition of mental state terms in a word list, using Single Photon Emission Computerised Tomography (SPECT). They found that there was increased cerebral blood flow during the mental state recognition task in the right orbito-frontal cortex, relative to the left orbito-frontal region. The authors concluded that in their view the right orbito-frontal cortex corresponds directly to the ToMM. As yet there is no study of autistic people to test if the pattern of brain activity is any different for these individuals.

### 1.7 Explaining the Social Impairments of Autism: The Interpersonal Relatedness Theory

For more than a decade R.P. Hobson has examined the possibility that children with autism demonstrate different social behaviours to individuals who do not have autism (Hobson, 1982, 1984, 1989a, 1989b, 1990a, 1990b, 1990c, 1991a, 1991b, 1991c, 1993; Weeks and Hobson, 1987; Hobson, Ouston and Lee, 1988, 1989). The concept of *interpersonal relatedness* is proposed to be (1) the level of analysis by which we may most adequately make sense of autism and (2) as encapsulating at once the cognitive and emotional (and conative and perceptual) nature of symbolic abilities and the ability to infer the mental states of others.

Hobson is not a social determinist and states explicitly in his 1991(a) paper *Against the Theory of "Theory of Mind"* that there is a biological basis for interpersonal relatedness. However, children come to know that other people have minds through the knowledge gained in experiencing interpersonal relations. Also, the use of imaginative role-taking is very important in interpersonal understanding. To apply such imaginative role-taking to an object rather than another person is one way of conceptualising symbolic play as a social capacity. Therefore this theory suggests the reverse of Leslie's (1987) theory. Interpersonal understanding leads to symbolic ability (pretence) rather than vice versa.

The interpersonal relatedness 'common denominator' serves the function of representing, in a single concept, the early dynamics of interactions with caregivers, as opposed to a theory of interpersonal dynamics which artificially divides the cognitive, the perceptual, the conative, or the emotional.

Hobson (1993) suggests that both our symbolic life and our knowledge of other people's mental states requires an affective engagement with other people. Innate propensities to engage others must be present, but so too must the interaction. As Hobson himself states, "innate mechanisms operate to yield interpersonally-coordinated attitudes between an

infant and others" (Hobson, 1993, p.156). These coordinated attitudes are "needed for an infant to develop creative symbolic functioning".

Hobson's approach answers the criticisms of Kanner's (1943) suggestion that viewing the lack of affective contact as the basis of autism could not predict linguistic and cognitive abnormalities (Rutter, 1983). Hobson proposes that the emotional 'give and take' of language is not present in autism. He points out that children with autism are relatively unimpaired in using abstractions which do not require interpersonal understanding (Hobson and Lee, 1989). In claiming that language is actually based in the joint co-ordination of attitudes between infant and caregiver, Hobson's approach offers a causal route *from* a lack of affective contact between persons *to* inappropriate use of language and more general socio-cognitive problems (e.g. capacity for self-reflection, deception).

The radical nature of this approach is important. If it is correct, then autism is a phenomenon where the intellectual and the social causes merge (Wing and Gould's 1979 survey would support this). More than this, the development of language, self, symbol, indeed the very development of mind are at once inseparably social/emotional and intellectual/cognitive.

Here, then is a theory which proposes that primary intersubjectivity (interpersonal relations) will lead to secondary intersubjectivity (self-knowledge, language, symbolic ability). Hobson seems wary of wasteful debates about whether autism is primarily 'cognitive', 'affective' or 'conative'. Indeed it is highly possible that autism only exists exclusively in one or other of these domains in the mind of the theorist.

Where Hobson (1993) feels there is evidence for a split in the development of mind, is between 'I-Thou' relationships which occur between a subject and other subjects, and 'I-It' relationships between a subject and objects. Hobson suggests that people with autism are aware that they exist in a world of manipulable objects but are relatively unaware that



they exist in a world of 'persons'. In this theory, 'persons' are seen to be something which the infant learns very early to regard as 'special'. Accordingly, symbolic play should reflect the relationships of the subject to significant others in their lives. This is, as Hobson (1993) notes about his theory generally, in tune with the object-relations school of psychoanalysis.

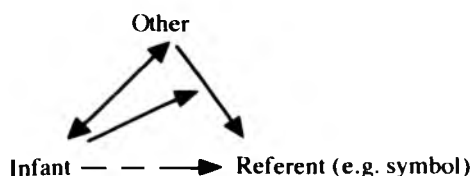
Hobson states explicitly (1991a) that it is mistaken to regard the developing child as a 'theorist'. Children, he argues, do not demonstrate a system of inferences in their behaviour. They do not show discrete hypothesis testing which leads to falsification or support for their 'theories of mind'. If the theory is *implicit*, that is, not requiring falsification to support or reject the inferences made, then perhaps a more appropriate term than 'theory' is required. To borrow from psychoanalysis, for example, "I project that you have mind" may sum up more accurately how understanding the mind of another person is rooted in one's own experience, not in the gradual refinement of 'theory of mind' by a miniature scientist carrying out systematic theory of mind tests.

#### 1.7.1 How does "Interpersonal Relatedness" Theory Account for Symbolic Play?

According to this theory, symbolic functioning has interpersonal origins. "Primary intersubjectivity" entails the one-year-old's emerging patterns of affective person-to-person sharing which one might conceptualise as 'being aware that one lives in a world of persons'. At one year, however, the child becomes aware that objects (and events) which are not other 'persons' can be shared with others. Importantly, the individual now becomes poised to show relatedness towards others, the world of objects and the self.

The interpersonal relatedness theory of symbolic development can be expressed in terms of a 'relatedness triangle'. Figure 1.1 demonstrates.

Figure 1.1



Note the important element of this triangle that the infant perceives the attitude of the other and also the *directedness* of this attitude. An *attitude* is to be considered here the mental position of a person towards a symbolic referent or other person. Central to the infant's comprehension of others' attitudes is her perception of the directedness of gaze and emotional state of these others.

The child understands the directed, functional nature of having attitudes-towards-objects-in-the-world. This is the point of 'showing' behaviours in one-year-old infants. They wish to align and coordinate a joint-attention to an object. This is the theoretical link of Hobson's work and that of Mundy, Sigman and colleagues at UCLA. Why show things to other people, if there is no perception that both people have attitudes to the object in question? Joint attention directly represents interpersonal relatedness.

This argument touches not only on cognitive capacities to perceive relatedness and symbolic referents, and the affective nature of relatedness. It also requires some attention to the conative elements of children's early development. One has to want to engage in a relatedness triangle. This is important for the current thesis. It means that if one wishes to examine the cognitive and affective nature of a symbolic function (such as symbolic play), it requires some control of conative factors. This will be taken on board in the empirical studies of this thesis.

We have a picture of an infant who assumes psychological attitudes not only to other individuals, but also to objects which either the infant can have psychological attitudes towards, or another person can have attitudes towards. The attitudes of the infant and of the other may differ, but are coordinated in the relatedness triangle.

For this level of awareness to develop, interpersonal relatedness theory requires the infant to be already influencing the actions of others. This can indeed be seen in such behaviours as requesting. This means that pre-verbal communication may actually be a prerequisite for the development of the relatedness triangle (see Christie, Newson, Newson and Prevezer, 1992; Wimpory and Chadwick, personal communication).

With the relatedness triangle in place, independent symbolic abilities are due to the 'interiorisation' of the configuration of interpersonal events. First, infants distinguish attitudes from things at which attitudes are directed. Second, infants realise their own potential for assuming another person's attitude towards an object. Third, the infant is now placed to discover that given, interpersonally-negotiated 'meanings' can be assigned to symbols which serve to 'carry' the meanings. New realms of abstract communication and what we might call 'intellect' now open up before the young child.

It is not the case that only one relatedness triangle exists (infant-carer-referent). Nor is it the case that any one triangle is as simple as the prototype represented in Figure 1.1. For example, by using the referent as a 'pivot', the child can perceive that several others can have similar or different attitudes towards the same referent. Or alternatively, the child can perceive that a range of referents are perceived by the other. Figures 1.2 and 1.3 illustrate the respective variations.

Figure 1.2

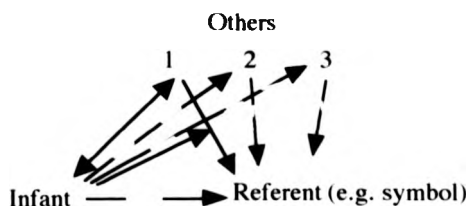
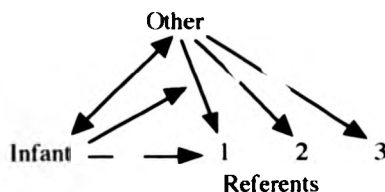
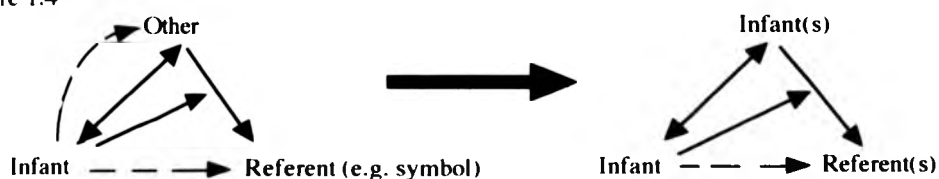


Figure 1.3



Furthermore, Hobson (1993) demonstrates that the 'relatedness triangle' allows the child to 'move into' the psychological position of the other (Figure 1.4). If the infant is this capable, it is but a short step to conceptualising her or his own mind as a special case in moving into the psychological position of the other. If this is indeed the method by which children become self-aware, then one might expect a dissociation of first-person feelings and objective self-knowledge. Gopnik (1993) presents an interesting discussion of this issue in which she favours such a dissociation. For current purposes, it is sufficient to state that the relatedness triangle unifies symbolic development and development of the awareness of others' mental states.

Figure 1.4



Hobson (1993) argues that the relatedness triangle is essential for symbolic development. He states that the mechanism by which infants come to symbolise is through insights into shifts in perspective occurring through identification with others' attitudes or potential for particular attitudes. We have arrived at a key difference between this account of symbolic development and that of Leslie (1987).

This theory implies that symbolic abilities must arise through experience of interpersonal affective relations with others, specifically through identification with projected attitudes attributed to these others. Leslie (1987) defines knowledge of mental states, or as he calls it "theory of mind", as arising from an innate capacity for metarepresentation. The causality of the two theories in this regard are the inverse of one another. The interpersonal relatedness approach suggests that symbolic play is the product of attributing a suspended 'for-serious' attitude to the symbolic object (e.g. teddy is not alive) whilst at the same time attributing a 'not-for-serious' attitude to the object. The child can adopt both attitudes at will. McCune-Nicholich (1981) calls this 'double knowledge'. Only through experience of 'others-with-attitudes' can this occur, according to this theory.

*"An interpersonal process is transformed into an intrapersonal one. Every function in the child's cultural development appears twice; first, on the social level, and later on the individual level; first, between people (interpsychological) and then inside the child (intrapersonal). This applies equally to voluntary attention, to logical memory, and to the formation of concepts. All the higher functions originate as actual relations between human beings" (Vygotsky, 1978, quoted in Hobson, 1993, p.131; Vygotsky's italics)*

Now that the theoretical account of symbolic play has been clarified, is there any neurological evidence to suggest that the relatedness of autistic people is disturbed? Recently, Eric Courchesne has suggested that the cerebellum, specifically the neocerebellum, may have been wrongly assumed to be restricted to motor functioning (Courchesne, 1991; Akshoomoff and Courchesne, 1992). His radical suggestion is that the neocerebellum, phylogenetically the newest part of the cerebellum, may be important in the voluntary shift in selective attention between the sensory modalities. This part of the brain has connections to the pulvinar, and the superior colliculus. There are also connections to the parietal and frontal cortices, areas which are traditionally associated with executive functions.

Akshoomoff and Courchesne (1992) examined the function of the neocerebellum in six patients with cerebellar damage and in 13 controls. Two experiments were described. In the first, subjects were required to rapidly shift their mental focus of attention between auditory and visual stimuli. In the second, subjects were required to continuously maintain a focus of attention. In the first experiment performance in shifting between modalities (accuracy) when targets were presented rapidly and with little time in between, was compared to performance when they were presented less rapidly.

The subjects demonstrated similar performance in the focus of attention experiment. However, subjects with cerebellar damage performed poorly when required to shift rapidly between vision and audition. The authors suggest that the neocerebellum should be assigned a new role in cognitive operations; the facilitation of rapid and accurate shifts of attention.

The authors further suggest that autism may be a disorder of foetal or infantile neocerebellar dysplasia (disordered development of the neural tissue). Courchesne et al. (1994) have demonstrated that this feature can be identified by magnetic resonance

imaging in people with autism, irrespective of their general intellectual level. These findings may be integrated with Hobson's view that interpersonal relatedness in autism is interrupted: it is probable that difficulties experienced by the infant in changing the focus of attention between vision and audition will have profound social implications for the development of affective co-ordination.

Of the recent neuroanatomic studies reviewed by Courchesne (1991), five out of five autopsy studies and nine out of 12 neuroimaging studies report cerebellar abnormalities. Courchesne feels that this disparity may reflect restrictions in neuroimaging technology. Autopsy studies enjoy the advantage of microscopic analysis of brain tissue.

Of 11 neuroimaging and four autopsy studies examining the cerebral hemispheres, thalamus, basal ganglia, and lateral/third ventricles, no consistent results have emerged. Courchesne (1991) reports that one autopsy study out of four has found evidence for enlargement of the third ventricle in autism (Jacobson, Le Couteur, Howlin and Rutter, 1988). Also, two autopsy studies found evidence for limbic abnormality (Bauman, 1991; Bauman and Kemper, 1985).

The relative consistency of the findings regarding the cerebellum seem specific to the neocerebellum, since many people with autism seem to have intact anterior paleocerebellar structures. Courchesne (1991) also reports that the brainstem and fourth ventricle/cerebellar cisterns may be abnormal, but the evidence is inconsistent.

"The cerebellum is the only anatomical structure for which there is both imaging and autopsy evidence of abnormality based on data gathered by many laboratories."  
(Courchesne, 1991, p.788)

What does this mean for interpersonal relatedness? Infants become disturbed or disinterested when their carers do not interact with them in real-time, and cerebellar

dysplasia could be responsible for a disruption of normal interaction. Consider the study of Murray and Trevarthen (1985). Two- and three-month-old infants were sat in front of a television monitor, on which was shown the mother's 'live' face looking towards the infant. The mother herself could see the infant via a monitor. Through this setup, a surprisingly 'fluent' interpersonal engagement was achieved. When the children were played their mother's face with a 30-second delay between her behaviour and the infant seeing the playback, the infants became distressed and/or looked away, momentarily glancing back at the screen.

If such a 'perturbation' was to be caused not by external events, but by neocerebellar damage interfering with the perception of social events, Courchesne may have discovered the neurobiological basis of poor interpersonal relatedness between children with autism and others. It certainly seems that real-time synchrony of interpersonal behaviour is required for satisfactory relating. Add to this Hobson's view that symbolic, self-reflective and linguistic abilities require such relatedness and the potential implications of Courchesne's work become apparent.

Are there any other ways in which the theory can be tested? If poor relatedness is indeed at the core of autism, then improving relatedness should theoretically reduce 'autistic' symptoms. Wimpory and Chadwick (personal communication) have demonstrated that the interactive behaviours of therapists can be crucial to outcome in children with autism. Using musical instruments as communicative tools, the authors describe how by 'slowing' interaction to the child's pace (e.g. by banging a drum and waiting for the child to do the same) and building more complex interactions on top of basic turn-taking, much progress is possible.

The authors describe a case study where three outcome measures were recorded at three-week intervals. The conditions were: free play with toys, free play with an adult, and free play with both toys and an adult. The outcome measures were: eye contacts, initiations of



interaction made by the child, and the number of times the child changed the rules of a game between the child and the adult. These measures were assumed to represent three identifiable areas of impairment in autism; affective contact, communication, and rigidity / obsessions in thought.

The results were startling. The number of eye contacts increased dramatically across the intervention period, relative to a baseline period, as did the number of initiations of interaction made by the child (in this case from 20% to 75%). Furthermore, four of the seven intervention sessions demonstrated at least one rule change made by the child in the course of the interaction. On one occasion four rule-changes were made by the child. This compares to no rule changes made during any of the six baseline sessions.

Wimpory (1992) has followed-up this case and demonstrated that the effects of the intervention were not transient. Although this is only a single case, Wimpory and Chadwick (personal communication) suggest that intervention such as their therapeutic approach..

"..parallels the interactive patterns of mothers with their infants in that both involve the development of shared understandings through familiar play routines."

Let us make explicit the direction of this argument. Wimpory and Chadwick suggest that neurocerebellar abnormality such as that identified by Courchesne (e.g 1991) can account for a breakdown in the interactions which are crucial to the development of social agency, or what Hobson might describe as an awareness of being a person amongst persons-with-minds.

This is the tenuous speculation; that this therapy demonstrates that cerebellar, specifically neocerebellar abnormality may underlie failed interpersonal relations in autism, but that through intervention, some compensation is possible. If true, this supports Hobson's

theory of autism over the 'theory of mind' approach because an innate capacity for metarepresentation which is specifically damaged should not be amenable to improvement through modification of interaction. Yet Wimpory and Chadwick demonstrate that at least in the case of one child with autism, measured variables of social and communicative skills showed improvement.

It is interesting that Courchesne et al. (1994) and Courchesne (1991) suggested that neocerebellar damage is a feature of children with autism irrespective of general intellectual delay. Akshoomoff and Courchesne (1992) suggested that the neocerebellum has 'a new role in cognitive operations', that of coordinating rapid shifts in attention between vision and audition. As a further test of the interpersonal theory, one might expect that other disorders where interpersonal co-ordination is interrupted *perceptually* would show features in common with autism.

Hobson (1993) suggests that the disorder of congenital blindness may provide some evidence of the centrality of perceiving persons in the development of social and linguistic skills. For example, Fraiberg and Adelson (1977) describe three congenitally-blind children with no general intellectual delay whose symbolic play was delayed until after they were three years old.

One of these children, Kathie, Hobson (1993) describes in some detail. She "could not represent herself through a doll or a toy. She could not create or invent a situation in play. She could not attend to a story or answer questions regarding a story or tell a story herself." (Fraiberg and Adelson, 1977, p.256) At the age of three years, Kathie could not pretend playdough was a cookie. However, by four years old Kathie could represent herself in play, and could use personal pronouns correctly. By six, she was socially and linguistically accomplished, inventive in play, deceptive, and socially independent. That is, Kathie could not have had autism to demonstrate such a full compensation of her delays.

The interpersonal relatedness argument explains the occurrence of such symptoms in children with congenital blindness. These children have to compensate through other senses for poor access to visual information that they are 'persons among persons-with-attitudes'. Hobson (1993) argues that symbolic play, 'sharing' of experiences, echolalia, and personal pronoun use are all found to be delayed in blind children. However, most of these problems have been fully compensated at seven years.

In terms of the 'relatedness triangle' we 'see' the intentionality of the visually-portrayed attitudes of others. Blind children obviously cannot do this. However, Hobson (1993) seems unaware of Courchesne's (1991) results. These areas of research could potentially cross-pollinate to yield a developmental model of autism which links brain function to the importance of interpersonal perception and co-ordination of attitudes.

#### 1.8 Uncomfortable Evidence for the Metarepresentational Theory

There is some evidence which does not wholly support the metarepresentational theory. We have seen that there is some evidence for a reduction in autistic symptoms via communication therapy. We have also seen that some children with severe perceptual impairments can demonstrate autistic features. Because these impairments dissipated over time (i.e. the children were not autistic) it is not logical that a basic symbol impairment was responsible. Hobson (1993) suggests that this might indicate that relatedness leads to symbolic life and not vice versa.

Another point is that the level of symbolic play shown by autistic children is higher in situations where more structure is provided to the child (Lewis and Boucher, 1988; Jarrold, 1992, personal communication; Sigman and Ungerer, 1984). A basic symbol impairment is not supported by these findings, because (1) cognitive deficit or delay implies that no improvement can be shown by simply rearranging the situation -

improvements, if they occur at all, should be gradual and developmental - and also, (2) because knowledge of mental states in autistic people cannot be improved in this way. The second point is particularly difficult for Leslie's (1987) thesis. However, Perner (1993, 1991) has proposed a metarepresentational model which takes account of the disparity between latent symbolic ability and theory of mind in autistic people.

One plausible objection to the theory of mind concept has been that since autistic children show less desire for peer interaction, that *all* their social knowledge is impaired (Hobson, 1992). In fact, Baron-Cohen (1993b) contended that knowledge about mental states is specifically impaired. The hypothesis that knowledge of the social world *in general* is impaired can be discounted with some certainty.

#### 1.9 Uncomfortable Evidence for the Interpersonal Relatedness Theory

There has been some difficulty with the idea that children with autism are poor social perceivers. Although Hobson et al. (1980) did find differences in the strategies used by autistic children to perceive emotions, their results did not directly replicate the findings of Weeks and Hobson (1987). Given that Hobson (1986) was clear that emotion perception should be a salient feature of autism, conflicting results such as these should not occur. However, the criticism levelled by Baron-Cohen (1993b) that emotion perception impairments are not apparent when controls are matched for verbal ability is perhaps unwarranted, because autistic people often demonstrate verbal ability which does not reflect their non-verbal intellect.

Nevertheless, there is a contrast between the conflicting evidence of the emotion perception studies and the clear evidence for theory of mind impairments. This point is particularly difficult for Hobson's theory.

In addition, Baron-Cohen (1994; also Baron-Cohen et al., 1994) has coherently accounted for joint-attention impairments which had previously been held to predate mental state understanding. Whilst it might still be held that full understanding of mental states only emerges at about four years, Baron-Cohen proposes the existence of three metarepresentational parallel processing units, these being: the Shared Attention Mechanism (SAM), which is responsible for the interpersonal coordination eye contact; the Theory of Mind Mechanism (ToMM) which is separately and distinctly responsible for understanding others' minds, and the Eye Direction Detector (EDD), which he proposes to be responsible for expanding eye contact to other objects.

Since the SAM exists in parallel with the ToMM and the EDD, this allows the cognitive theory to incorporate the findings of joint-attention studies. In this theory, one could be damaged before the others are due to mature - as seen in joint-attention studies with very young autistic children - but all will be damaged because the underlying *metarepresentational* basis of all three is the root of the autistic symptoms. Hobson's contention is that interpersonal relatedness is the only conceptual common denominator (Hobson, 1993) which allows us to fully understand autism, but one would doubt that Baron-Cohen accepts this. In his theory (Baron-Cohen, 1994) the functions of the SAM, ToMM and the EDD are possibly anatomically, but certainly functionally distinct despite all being 'metarepresentational'. Clearly, Hobson (1993) does not feel that features of interpersonal relatedness should be considered in this way, lest the true indivisible nature of interpersonal understanding (as he would see it) is lost.

#### 1.10 Brief Introduction to Alternative Theories

Recently, Perner (1993) has outlined his alternative theory of metarepresentational and symbolic play. His first point is that the term 'metarepresentation' implies representing about representing. However, symbolic play does not entail representing about representing. "Theory of mind" ability does entail representing about representing.

Perner's definition of metarepresentation does not suggest the 'decoupling' of primary perceptual representations leads directly to a metarepresentation. This is his second point. People with autism are more metarepresentation-impaired (e.g. in false belief understanding) than decoupling-impaired (e.g. in symbolic play).

Perner (1993) challenges the very notion of a 'decoupling mechanism'. He suggests that children with autism may lack a 'database' of social information which they would need to 'build' a 'theory of mind'. Perner (1993) acknowledges Courchesne (1991), suggesting an impairment in co-ordinating perception of social information.

Perner's theory is a modification of Leslie's (1987) thesis which is more consistent with evidence from studies of symbolic play. It retains a cognitive nature and does not address an affective level of analysis as such.

Tantam (1992) attempted to characterise the fundamental social handicap in autism. His view was that an early developmental process was responsible for later affective and theory of mind impairments - the *social gaze response*. This was the inherent tendency of the normal infant to focus gaze and attention on social gaze, and later on the objects in the environment as indicated by the gesture of others. Tantam (1992) argues that this response accounts even for theory of mind.

Certainly there are many clinical accounts of bizarre eye gaze in people with autism, and at the very least eye gaze is not used with great social skill. The importance of Tantam's contribution is seen in Baron-Cohen's (1994) model of the mindreading system, which does not incorporate social gaze into the ToMM - instead the SAM is proposed. This is partly because the theory of mind theory could not account retrospectively for impairments seen before two years of age. Therefore Tantam (1992) has proposed an important alternative theory which may have influenced the theory of mind research programme.

A further alternative theory was summarised in Rogers and Pennington (1991). They suggest that early social capacities involving imitation, emotion sharing, and theory of mind are primarily and specifically impaired in autism. Further, they suggest that these three capacities involve forming and coordinating social representations of the self and other at increasing levels of complexity via representational processes that extract patterns of similarity between the self and the other. This work is in some ways an extension of Stern's (1985) theory of interpersonal development. However, it also proposes a neuropsychological model of interpersonal co-ordination involving prefrontal and executive function capacities consistent with the social impairments of autism.

Unlike Tantam's (1992) theory, Rogers and Pennington (1991) suggest more than one basic factor underlying autism. At present, it remains difficult to choose between theories, because evidence of specific impairments in autism does not necessarily imply causation. As Hobson (1993) remarks, this problem is quite general for the builder of theories of autism.

### 1.11 Aims

There are several ways in which we can add to the present evidence. First, we can ask whether symbolic play can be influenced by the presence of different environmental conditions. Second, we can examine affective and attentional factors in the symbolic play situation, with a view to comparison between autistic and non-autistic children. Third, we can seek to replicate the suggestion made by Lewis and Boucher (1995) that only spontaneous and elicited symbolic play are impaired in autism. Finally, we can examine 'referential looking' in a symbolic play situation - how different is this in children with autism?

So to recap, the empirical studies of this thesis shall ask the following questions:

- Can a social stimulus influence symbolic play - and is this different in autism?  
*(a strong effect suggests that we might have to modify metarepresentational theory towards a broader concept, possibly Hobson's)*
- Do certain affective/attentive variables relate to symbolic play differently in children with autism and children without autism?  
*(again we might have to broaden our model of symbolic play to include other factors)*
- Are specific kinds of non-spontaneous symbolic play impaired in autism (e.g. play which requires the child to produce the symbolic idea)?  
*(is generativity impaired in autism rather than symbolic ability per se?)*
- Is there therefore less 'referential looking' from the child to the experimenter in children with autism than in controls, in a symbolic play situation? *(Is a symbolic play situation, in which an experimenter takes part, a relatedness triangle?)*



## Chapter 2

### **The Presence of a Musical Stimulus and the Symbolic Play of Pre-school Children**

#### 2.1 Introduction

The purpose of this introductory study was to examine whether a stimulus which has a social or affective meaning could influence the symbolic play of young children. In Chapter 1, it was seen that metarepresentation is proposed by Leslie (1987) as an innate ability which is manifest in symbolic play. This study was designed to establish whether metarepresentational behaviour enjoys independence from social-affective stimuli.

It was necessary to incorporate two things in the experimental design of this study. First, it was necessary to construct a structured symbolic play test. This test included elicited, instructed and modelled components. This was intended to maximise the symbolic play demonstrated by the participants. The lesson of structuring the symbolic play test was taken from such studies as that by Sigman and Ungerer (1984) and Lewis and Boucher (1988, 1995). As well as the maximisation of symbolic play, structuring the test also has the advantage of reducing the influence of conative factors (e.g. a lack of motivation to play symbolically).

The second necessary feature of this study was an appropriate stimulus which can reasonably be expected to potentially influence the behaviour of young children. Instrumental music was chosen as the external stimulus which was hypothesised to influence symbolic play. Symbolic communication (language) is associated with left-hemisphere function, whereas affective processes, and spontaneous expressive

non-verbal communication, are associated with the right hemisphere (Buck, 1984). The perception of music tends to be associated with right-hemispheric activity, at least in right-handed individuals (Bryden and Ley, 1983). So there is a concordance of right-hemisphere specialisation for both emotions in general and the perception of music. We might infer that they are linked, and that music can manipulate emotions directly. The perception of music is an experience sought for its pleasantness, although these feelings are difficult to verbalise. When the person tries to verbalise these feelings via affective words, the emphasis of neuronal activity becomes left-hemispheric once again (Strauss, 1983).

Of course, an effect of a musical stimulus could well be 'cognitive' in nature. If such an effect on the symbolic play of the participants is found, the question is not whether symbolic play is 'cognitive' or 'affective', but rather which approach (representational or interpersonal) is the most appropriate 'frame' for the data. The suggestion here is that finding 'no effect' of the music on the play means that a cognitive view of symbolic play is more appropriate, because in Leslie's (1987) approach metarepresentation is not a *result* of interaction. If there was an effect of the music, this means that a dynamic interpersonal approach is more appropriate, because in Hobson's approach (e.g. 1993) symbolic play *is* the result of interaction.

Turning to the symbolic play test itself, play was judged to be metarepresentational if the child referred to an absent object, attributed properties to an object which it did not have, or used the object as if it were another object (c.f. Leslie, 1987). Manipulative play and functional play were classed as non-symbolic. This is conservative, since it may be argued that functional play involves the suspension of the knowledge that the play object is different to the real object which it represents. For example, a child pushing a model car across a floor may have attributed the

property that the car is the appropriate size to be a 'pretend toy car'. This fits with Leslie's second criterion.

For the purposes of avoiding extra controversy, such play shall be regarded as nonsymbolic. A further feature of the symbolic play test is the application of an overall symbolic play score which is intended to characterise the child's symbolic play across the entire session. The rationale for the inclusion of such a score is for the purposes of statistical analysis. Producing symbolic play after an **elicitation** ("What can we do with these?") is difficult in relation to producing symbolic play after an **instruction** (e.g. "Show me how we make a seat for the doll with these?"). This is, in turn, difficult in relation to producing play after **modelling** ("I shall do it first. Can you copy how I do it?").

Because of this relative difficulty, a score of three was given for each play act which occurs on elicitation, a score of two for each play act on instruction, and a score of one for each play act which has to be modelled by the experimenter. The play acts in each category shall also be considered in their own right (number of occurrences).

The hypothesis of this introductory study is that the inclusion of the musical stimulus shall have an effect on the symbolic play of the participants, either in terms of particular play categories, or in terms of composite symbolic play score. At this point the role of the music is to have a social significance which indicates the appropriateness of play to the child.

## 2.2 Method

*Participants.* Eighteen children were recruited from a local nursery. Their mean CA was 49.4 months (ranging from 44 to 53 months). There was a 1:1 ratio of girls to boys.

*Materials: Music.* The music was played to the participants via a Phillips Twin Tape Studio II, and the piece was an improvised instrumental named 'funny tune' by the local musicians who produced it.

*Materials: Symbolic Play.* There were two sets of toys: section (a) realistic objects: miniatures of a brush, a spoon, a car, a pickup truck, a cow, a gate, a motorbike, and a bowl; section (b) nonrealistic objects: a set of blocks, a counter, a stick, some felt, a rubber, a box, some foil and some playdough. With the nonrealistic toys, a car or a doll (child's preference) were used to facilitate play with the objects. Table 2.1. provides summary information on the subjects and the factors involved.

---

Table 2.1 Chronological Age (CA), Gender of the Subjects and Dependent and Independent Factors

	CA		Girls : Boys	
	mean	SD		
Subjects (n=18)	49.4m	8.2m	9 : 9	
Independent Factor	Presence / Absence of Music			
Dependent Factors	Symbolic Play <ul style="list-style-type: none"> <li>- elicited</li> <li>- instructed</li> <li>- modelled</li> <li>- instances of no play</li> <li>- composite score</li> </ul>			

*Procedure.* A within-participants design was adopted. Presentation of the symbolic play items was counterbalanced, so that a child would either experience the music first and odd toy items first, the music first and even toy items first, no music and the odd toy items first, or no music and the even toy items first. Both realistic and nonrealistic toys were presented in each condition.

For example, the first child to be tested would encounter the brush, the car, the cow and the motorbike, and the blocks, the stick, the piece of rubber and the foil (the odd toys) in the music condition. The child would encounter the spoon, the pickup truck, the gate and the bowl, and the counter, the felt, the box and the playdough in the control condition (the even toys). The second child would also encounter the music condition first, but the even toys first. The third child would encounter the control condition first and the odd toys first, and the fourth child would encounter the control condition first and the even toys first. The fifth child would mark the return to the beginning of this counterbalancing method.

First, the playback of the music would be started if appropriate. The child would then be presented with (depending on counterbalancing) the brush, the spoon, the car and the bowl, or the pickup truck, the cow, the gate, and the motorbike. Each toy was considered as one potentially symbolic item.

The experimenter would then ask the child of the toy "What can we do with this/these?" (in the hope of eliciting symbolic play). If the child demonstrated symbolic play, a score of 3 was recorded, and the experimenter moved on to the next toy item. If no play was demonstrated at this stage, the experimenter would instruct the child to play symbolically (e.g. "Show me how we eat some soup with the spoon"). If the child demonstrated symbolic play at this stage, a score of 2 was recorded, and the experimenter moved on to the next item, beginning again with

elicitation. If no play was demonstrated at this stage, the experimenter would model a symbolic behaviour ("I shall do it first. Can you copy how I do it?"). If the child demonstrated symbolic play at this stage, a score of 1 was recorded. In any case, the experimenter moved on to the next item, starting again with elicitation.

This process was repeated until all the items in the realistic section had been presented. The same procedure was executed for the nonrealistic items, with the added feature of the presence of the doll or car. The child would be presented (depending on counterbalancing) with the blocks, the counter, the stick and the felt, or the rubber, the box, the foil and the playdough. Throughout the procedure, the instances where play was only functional or manipulative in nature were also recorded. However, if nonsymbolic play was recorded the experimenter would still attempt to obtain symbolic play. For instructions for symbolic play please refer to Appendix 2.1.

Symbolic play and nonsymbolic play were analysed in two ways; by the frequencies of each type of play, and by composite scores built from all the types of play demonstrated in each condition (3 for elicited, 2 for instructed, 1 for modelled, and 0 for no response).

### 2.3 Results

Since there was a maximum of only eight symbolic and eight non-symbolic acts in each condition for each child, results were considered using the Friedman test, which is a non-parametric equivalent of a repeated-measures one-way analysis of variance. The results of this series of tests are shown in table 2.2 (ANOVA results are shown in Appendix 2.2). It will be seen that only elicited symbolic play was significantly higher in the music condition. This supports the hypothesis that the symbolic play of young children can be influenced by a stimulus which has a social significance, e.g. instrumental music.

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Table 2.2 Results of Friedman Tests for the Effect of Condition on Play

Variable	Mean in music condition	Mean in control condition	Friedman Test Statistic	p
Elicited Symbolic Play	5.0	3.6	10.9	<b>0.0</b>
Instructed Symbolic Play	1.7	1.2	0.0	0.5
Modelled Symbolic Play	0.1	0.6	1.4	0.2
Elicited Nonsymbolic Play	0.4	1.5	2.0	0.2
Instructed Nonsymbolic Play	0.3	0.4	0.1	0.8
Instances of No Response	0.8	0.4	1.4	0.2

n.b. Modelled nonsymbolic play was not demonstrated in either condition.

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Figure 2.1 Mean Number of Symbolic Play Acts by Category and Condition

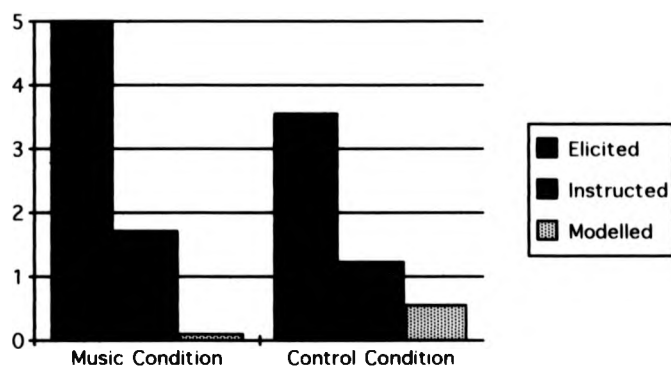


Figure 2.2 Mean Number of Nonsymbolic Play Acts by Category and Condition

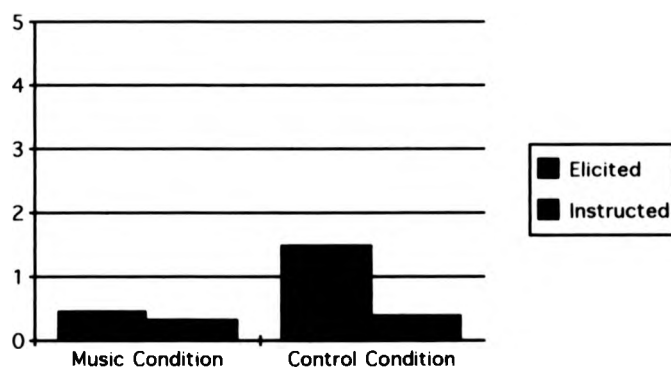


Figure 2.3 Mean Number of Instances Where No Response Was Made

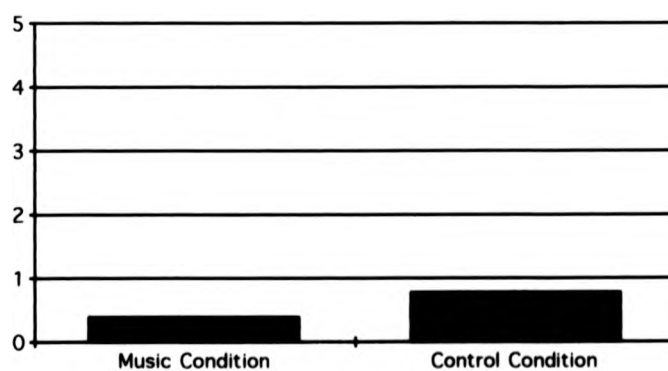




Figure 2.1 demonstrates the mean number of symbolic acts by category of play and condition, figure 2.2 demonstrates the mean number of nonsymbolic play acts by category of play and condition, and figure 2.3 demonstrates the mean number of instances where the child did not respond at all, by condition. When composite symbolic play scores were analysed for possible condition effects, significantly higher scores were found in the music-present condition ( $F(1,17)=7.4$ ,  $p<0.05$ ). For additional statistical control, the data was entered into a 3-way Analysis of Variance to test for possible two- or three-way interactions of condition, (counterbalanced) order of condition, and (counterbalanced) order of toy set presentation. Only the condition effect reported above was significant. This strongly suggests that the presence of music was responsible for the difference across conditions. The fact that elicited play was higher in the music condition whilst other types of symbolic play were not significantly different will be discussed. A further ANOVA suggested no significant sex effects.<sup>4</sup>

The effect of condition on composite non-symbolic play scores was not significant ( $F(1,17)=2.4$ ,  $p=0.1$ ). However, because this type of play was only demonstrated in the absence of symbolic play, the relative infrequency of non-symbolic play undermines this result.

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<sup>4</sup> Unfortunately, it was impossible to construct a four-way analysis of variance including sex effects because of the loss of statistical power. However, a regression analysis with stepwise deletion in which all four variables were included suggested that gender, order of condition, and order of toy set presentation did not predict composite symbolic play score. The effect of condition was again observed.

## 2.4 Discussion

The symbolic play of the preschool children was influenced by the inclusion of a musical stimulus. In looking at the categories of symbolic play separately, it was clear that the difference lay in elicited symbolic play. It will be remembered that elicited symbolic play entails the production of the symbolic idea by the child. Therefore, it seems that the *generative* symbolic play of young children may be influenced by musical stimuli. However it has to be remembered that because there was no reliability testing of the symbolic play data, there is the possibility of bias.

Bias notwithstanding, these results raise a number of possibilities. If, as suggested in 2.1, instrumental music is an 'affective' stimulus, processed primarily in the right hemisphere, then it may be concluded that symbolic play has a relationship to emotional changes brought about by 'affective' stimuli.

At the very least, it seems that the degree to which metarepresentations are generated behaviourally will vary considerably, depending on changes in the environment, of which the presence or absence of music is one example.

Given this, it seems that one should expect symbolic play to be sensitive to social cues and changes in the social environment. However, it is not clear whether emotion or attention change on the inclusion of a musical stimulus. Investigation of the role of these variables might shed further light upon the process by which symbolic play is influenced by the musical stimulus.

In order to examine if emotion or attention are influenced by the music, a scale was designed to rate the child's affective mood and attention to the experimental task. Chapter 3 shall examine the design, validation and piloting of the scale, and its relation to the results presented so far.

It is very important to examine the possibility that the music was in fact a 'cue' which the child perceives and cognises as 'requiring' more metarepresentational behaviour. It is reasonable to expect 'affective mood' and 'attention to a task' to be independent factors.

If the music has a primarily 'affective' significance, then this is more easily explained within the context of an interpersonal relatedness approach. If the music has an attentive significance, then this might be more adequately framed within a cognitive perspective.

## Chapter 3

### **The Development of a Scale to Rate Affective Mood and Attention to the Experimental Task**

#### 3.1 Introduction

A specific hypothesis can be proposed on the basis of the results of the introductory study described in chapter 2, about the nature of the effect of the musical stimulus on the symbolic play of the participants. The effect could be framed in terms of 'affect' if the primary response to the stimulus is emotional and leads to an increase in symbolic play. Alternatively, the effect could be framed in terms of 'attention' if the primary response to the musical stimulus is one of increased attention to the task.

Although it may be naive to suggest that 'cognition' is the only function of sustained attention to a play task, an attentional effect due to a musical stimulus which results in increased symbolic play might entail that the child constructs a concept that more symbolic behaviour is required (rather than simply enjoying the task more). This type of effect could be framed in an updated metarepresentational model of pretence. The updating would take the form of viewing symbolic play, not only as a function of metarepresentational cognitions, but also as a product of cognitions about the amount of attention which is appropriate to a particular potential symbolic play situation.

An effect of affect due to the musical stimulus is not so easily framed in metarepresentational terms. Hobson (1993) points out that Leslie's (1987) concept of the decoupling mechanism does not have anything to do with emotion; it would

seem that Leslie views affect as either independent of the metarepresentational function or at least unimportant in explaining either symbolic play or autism.

In this chapter, the development of a rating scale which is designed to rate affective mood and attention to the symbolic play task is described. This development included two phases. The first phase was the design and establishment of face validity. The second phase was the piloting of the scale which was in fact carried out during the experimental testing described in 2.2. For clarity, this procedure is to be separately described in this chapter.

The objective of this study is to examine whether it is possible to devise a short rating scale which examines affective mood and attention to a particular task. Further to this end, the piloting of the scale which was carried out during the introductory study described in chapter 2, shall be reported.

### 3.2 Materials

Three scales of twelve items each were constructed. Each item consisted of a single statement. The first was designed to measure immediate affective mood. The second was designed to measure the level of sustained attention to a task. The third was a control scale, which was intended to measure neither affect nor attention in particular. The statements were presented with the numbers one to five. This was intended to allow the rater to either strongly agree with the statement (SA), agree with the statement (A), neither agree nor disagree with the statement (N), disagree with the statement (D), or strongly disagree with the statement (SD). Statements were counterbalanced for positivity / negativity so that perseverance effects would not introduce bias. Table 3.1 demonstrates some sample items from the affect scale. It was intended that these responses should be given appropriate numerical scoring. For example, if the particular statement was negative in nature and the rater was to (e.g.) strongly disagree, this meant a score of five. If the particular statement was positive in nature and the rater was to (e.g.) disagree with the statement, this meant a score of two.

---

Table 3.1 Sample items from the Affect Scale

3.The child is not enjoying the task.	SD	D	N	A	SA
4.The child is engaged happily in the task.	SD	D	N	A	SA

---

### 3.3 Procedure 1: Examination of Face Validity

These scales underwent two validation exercises. In the first of these, five independent raters were presented with the 36 items randomly on separate cards. They were asked to sort the cards into three piles: (1) affect, (2) attention and (3) general arousal, on the basis of which pile they thought the statement belonged. For a statement to be accepted as valid, the criterion adopted was correct sorting by four out of five raters.

In the second validation exercise, the same five raters were presented with the three twelve-statement scales individually, and asked to suggest what they felt each scale was designed to measure. This exercise was completed a week after the first, in order to avoid the raters remembering the piles they had sorted particular statements into.

### 3.4 Results 1: Examination of Face Validity

In the first validation exercise, ten statements from the affect scale and ten statements from the attention scale were correctly sorted by at least four out of five independent raters. This suggests that these statements may be used as items in a rating scale designed to measure affective mood and sustained attention to task.

In the second validation exercise, all five raters chose to attribute appropriate labels to the three scales presented. These results can be viewed in Table 3.2.

Table 3.2 Raters' Labels of the Affect / Attention / General Arousal Scales

	Rater				
	1	2	3	4	5
Affect Scale	Affect	Affect	Contentment	Affect	Affect
	Contentment Happiness			Depression Unhappiness	
Attention	Motivation Involvement Concentration	Attention Concentration	Attention	Attention Motivation Engagement	Attention
General Arousal	General arousal Emotionality Interest	General arousal	Motivation	Emotionality Excitability Behaviour swings	Arousal

This supports the use of the correctly-sorted statements as items in a rating scale designed to measure affect and attention-to-task. The complete rating scale thus consisted of the 10 items of the original affect scale and the 10 items of the original attention scale which were correctly sorted. The completed rating scale can be viewed in Appendix 3.1.



### 3.5 Procedure 2: Piloting of the Rating Scale

Piloting took place while the experimenter was gathering the data of the introductory study described in chapter two. After the symbolic play procedure had been carried out and the child was returned to her / his classroom, the experimenter completed the rating scale for the particular child, before seeing the next child.

The reader will remember that a repeated measures design was adopted, with 18 children (nine girls and nine boys, aged 44-53 months). The two conditions were the 'music' condition and the 'control' condition.

Scores were built in the following way. The answer to each statement indicated a score of one to five. The theoretical range of scores was therefore between (1\*10 items) 10 and (5\*10 items) 50. Thus, each child would have an 'affect' score and an 'attention' score for each condition, 'music present', and 'music absent', of between 10 and 50.

### 3.6 Results 2: Piloting the Rating Scale

Preliminary results from the piloting of the rating scale suggested that the difference in attention scores between conditions was not significant (Friedman test statistic=2.7,  $p=0.1$ ). However, affect scores were significantly higher in the music-present condition (Friedman test statistic =9.4,  $p<0.01$ ). However, these results should be treated with caution, since there was only a single rater, who could potentially be a source of bias. Table 3.3 shows the means.

---

Table 3.3 Means for Affect and Attention in Each Condition

*Music Condition*

	Mean	SD
Affect	38.4	4.7
Attention	40.4	2.8

*Control Condition*

	Mean	SD
Affect	32.3	7.8
Attention	38.6	3.5

---

### 3.7 Discussion

The rating scale which was designed to measure affective mood and attention to task would seem to have some face validity on the basis of these findings, at least insofar as they have been identified as 'affect' and 'attention' scales. Preliminary results also suggest that the affect of the children in the introductory study was more positive in the music-present condition than in the music-absent condition. Furthermore the development of the scale allowed the design of a study which examines the symbolic play of children with autism and their response to the presence of music, with the inclusion of affective and attentive variables.

At this point we do not know whether the potential effect is a calming one, or a social indication to the child that more play is appropriate. Yet whether calming or indicative, the effect would imply the need for a model of symbolic development including factors other than symbolic ability. Deciding between a calming effect and an indicative effect is not something which can be attempted at this stage, and without replication the question does not arise further.

The next study shall also examine whether affect and attention to task differ according to the presence or absence of a musical stimulus. Replication of the effect of music on symbolic play and affect ratings would add confidence to the findings presented so far. These preliminary results, if valid, are more easily accommodated by an interpersonal relatedness approach to symbolic play than by the original metarepresentational approach. This is because Hobson (e.g. 1993) implies the importance of affect whereas Leslie (1987) does not allude to affect at all. However, these preliminary results require confirmation, using a procedure which can be tested for reliability, before we can make any firm conclusions about their implications for the theory of mind and interpersonal theories of symbolic play.

## Chapter 4

### **The Effect of a Musical Stimulus on the Affect, Attention and Symbolic Play of Children with Autism and Controls**

#### 4.1 Introduction

The study which shall be presented in this chapter had several objectives. First, it was seen to be important to replicate the effect of the musical stimulus on the symbolic play of young children, in order to be sure that the effect found in the previous study is reliable. Second, it was seen to be important to examine children with autism, because their lack of symbolic play is identified as evidence of poor interpersonal relatedness / poor metarepresentation by Hobson (1993) / Leslie (1987). Third, relationships between affect, attention and symbolic play were to be examined in order to discriminate between the metarepresentational view of symbolic play, or the interpersonal relatedness view of symbolic play.

The lack of symbolic play in children with autism has been described as representative of a cognitive deficit (e.g. Baron-Cohen, 1987), but these findings have now been elaborated. It was suggested by Ungerer and Sigman (1981) that structuring a situation (such as by asking a question or modelling the symbolic act) increases the level of symbolic play demonstrated by children with autism. This has been supported (for a review see Jarrold, Boucher and Smith, 1993).

In a further refinement to our knowledge of symbolic play in autism, Lewis and Boucher (1995) suggest that *generativity* in play, rather than symbolic ability *per se*, may be impaired in autism. In their study, the performance of children with autism in symbolic play was not inferior to that of controls when ideas were provided in the form of instructions. Performance was inferior in an 'elicited'

condition where the children had to generate their own symbolic ideas (whilst still being encouraged to play by the experimenter). It is important for the current study to take account of these findings, and contrast elicited symbolic play with instructed symbolic play.

It is widely accepted that the affect of children with autism is different from that of controls in situations which require social attention (e.g. Kasari, Sigman, Baumgartner and Stipek, 1993). As seen in 1.4, there is considerable evidence that affective contact with others is poorly established by children with autism (e.g. Lord, 1984). Also, affective sharing in joint-attention situations is poor in children with autism (e.g. Loveland and Landry, 1986), as is the perception of affect, in which they may develop abnormal strategies in order to compensate (e.g. Hobson, Ouston and Lee, 1988). They are also more idiosyncratic in their emotional expressiveness, and show empathy less often.

It was important to include attention in this study since the role of affect in autism seems intimately involved with attention to social stimuli. As in the previous study, non-spontaneous symbolic play was examined. Only one of the categories of symbolic play involves symbolic generativity (elicited symbolic play) and so it is possible to examine whether this is indeed what is specifically impaired in autism. Affect and attention shall be rated by two independent raters, from videotapes of the play. Again, 'affective mood' and 'sustained attention to the task' were the precise variables to be measured.

One change to the methodology was introduced. Non-symbolic play was found to be too rare in the first study (see 2.3) for reliable measurement. Therefore non-symbolic play was estimated whenever symbolic play is demonstrated, and a score assigned which 'shadowed' the symbolic play. For example, a symbolic act produced on instruction yielded a symbolic play score of 2 and a non-symbolic play

score of 2. The rationale for this is that symbolic play necessarily entails manipulative play. This should mean that the non-symbolic content of the play is more accurately represented statistically.

Finally, the interaction of the symbolic play score, affect score, and attention score was examined. Ozonoff, Pennington and Rogers (1991) suggested that emotional and cognitive abilities (e.g. emotion perception, false belief understanding) are more closely related in children with autism than in other children. It is important to examine this possibility since this may help in discriminating between the metarepresentational and interpersonal relatedness accounts of symbolic play and autism. For example, high correlations between symbolic play and affect would suggest that a full explanation of symbolic play needs to be explained in both cognitive and affective terms - the metarepresentational approach as originally proposed does not do this.

There is a further issue which may limit the implications of this study, namely that the children are chronologically older than those in the previous study, the difference between mean ages being some six years. Care should be exercised when comparing these studies. Autistic children are generally less intellectually able than children of a similar age and the measures were initially pitched towards those autistic children who were likely to show some play, i.e. the more intellectually able.

## 4.2 Method

*Participants.* Thirteen children with autism (who had received psychiatric diagnosis according to DSM-III-R) and 13 children in mainstreamed schools were selected for the experiment. Participants were matched via the Test for the Reception of Grammar (TROG; Bishop, 1983). Table 4.1 demonstrates the CA, Gender, and TROG age equivalences of the children included in the study. The TROG was administered by the experimenter approximately two weeks before the experimental procedure. Since the controls were slightly more able, an analysis of variance was conducted to test for a significant group difference in receptive language ability. This was not found.

Table 4.1 Gender, Chronological Age, and Receptive Language Age Equivalence

	Gender (Girls : Boys)		CA	TROG
Autism	4 : 9	Mean	10.3	9.0
(n=13)		SD	4.1	2.7
Controls	5 : 8	Mean	9.8	9.7
(n=13)		SD	4.3	1.5
Independent Factors		Presence / Absence of Music Group		
Dependent Factors		Symbolic Play	<ul style="list-style-type: none"> <li>- elicited</li> <li>- instructed</li> <li>- modelled</li> <li>- instances of no play</li> <li>- composite play score</li> </ul>	
		Rated Affect		
		Rated Attention		

*Materials and Procedure.* The materials and procedure for this experiment were identical to that described in 2.2, with the exception of the following. The play sessions were recorded by a JVC PAL VideoStar recorder with a tripod. These recordings were played back to two independent raters at a later date. Raters filled out one affect / attention rating scale (see Appendix 3.1) for each child for each condition. The rater would first watch an entire session, then the tape was paused for the rater to fill out the scale. The rater then moved on to the clip of the next child.

There were thus raw scores of symbolic play (frequencies of each category of play and composite scores), non-symbolic play, affect and attention for each condition, with in the case of affect and attention, a score for each rater for each condition.

There was one methodological change to the procedure described in 2.2. Non-symbolic play was scored even when symbolic play was demonstrated, by recording a score which 'shadowed' symbolic play. For example, if the child only demonstrated manipulative play after modelling, the child would be given a score of 0 for symbolic play and 1 for non-symbolic play. If the child demonstrated symbolic play after instruction, s/he would be given a score of 2 for symbolic play and 2 for non-symbolic play. It was therefore assumed that symbolic play necessarily entails manipulative play and is a 'higher-order' activity.



### 4.3 Results

Inter-rater reliability was calculated using intraclass correlations (ICC 2.2 : Shrout and Fleiss, 1979). These were calculated at 0.62 ( $p < 0.02$ ) for affect and 0.78 ( $p < 0.01$ ) for attention. This was judged to indicate sufficient reliability for the raw affect and attention scores of the two raters to be averaged and considered as single scores. No reliability coefficient for symbolic play was computed, since play was scored by a single rater, and the data was not suitable for split-half reliability estimation (within-group-within-condition comparisons would lack statistical power). This is an important qualification of the results.

First, it was judged important to examine group differences in symbolic play. Second, it was judged to be important to examine whether there was any effect of a musical stimulus on either symbolic play, affect or attention in each group. Third, it was possible to examine relationships between symbolic play scores, affect scores, and attention scores in each group and each condition. To meet the first of these objectives, a series of Mann-Whitney U tests were carried out on the play variables within each condition. The results are reported in table 4.2. Analyses of variance were also carried out, and can be viewed in Appendix 4.1. No interactions of group by condition were found.

It will be seen that the children with autism exhibited less elicited symbolic play in the music condition\*, and also in the control condition. In addition, the children with autism demonstrated more instances where they did not respond at all, in both the music condition, and in the control condition. These differences can be observed in figures 4.1 (play by condition and category in the children with autism), 4.2 (play by condition and category in the controls) and 4.3 (non-responses by condition and group).

\*This result was not significant using ANOVA (See Appendix 4.1)

Table 4.2 Mann-Whitney U Tests for Group Differences in Play in the Music and Control Conditions

<i>Music Condition</i>				
<u>Variable</u>	<u>Mean: autistics</u>	<u>Mean: controls</u>	<u>U</u>	<u>p</u>
Elicited Symbolic Play	4.2	5.8	36.5	<b>&lt;0.02*</b>
Instructed Symbolic Play	1.8	1.8	99.0	0.4
Modelled Symbolic Play	0.6	0.2	109.5	0.1
Elicited Nonsymbolic Play	5.8	6.2	80.0	0.8
Instructed Nonsymbolic Play	1.2	1.5	68.5	0.4
Modelled Nonsymbolic Play	0.3	0.2	92.0	0.6
Instances of No Response	1.4	0.1	143.0	<b>&lt;0.01</b>
<i>Control Condition</i>				
<u>Variable</u>	<u>Mean: autistics</u>	<u>Mean: controls</u>	<u>U</u>	<u>p</u>
Elicited Symbolic Play	3.8	5.1	43.5	<b>&lt;0.04</b>
Instructed Symbolic Play	2.2	1.7	86.0	0.9
Modelled Symbolic Play	0.5	0.8	99.0	0.3
Elicited Nonsymbolic Play	0.4	1.0	78.0	0.7
Instructed Nonsymbolic Play	0.5	0.6	73.0	0.5
Modelled Nonsymbolic Play	1.0	2.0	87.5	0.8
Instances of No Response	1.5	0.5	126.0	<b>0.02</b>

\*nb this result was not significant using ANOVA (see Appendix 4.1)

Figure 4.1 Mean No. of Symbolic Play Acts by Condition and Category; Autism

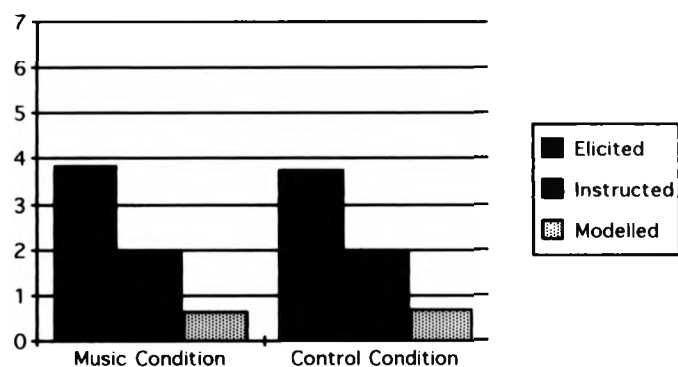


Figure 4.2 Mean No. of Symbolic Play Acts by Condition and Category; Controls

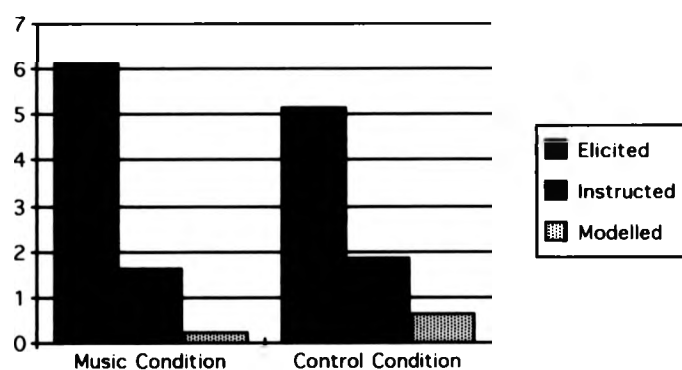
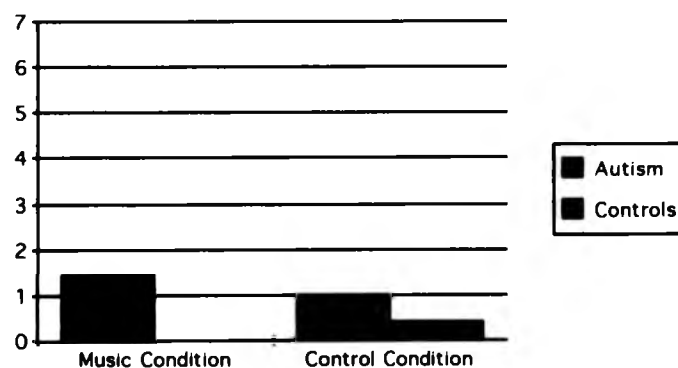


Figure 4.3 Mean no. of Instances Where No Response Was Made; Both Groups



To meet the second objective, a series of Friedman tests were carried out on the play variables within each group. The results are reported in table 4.3. The only result which reached significance was the condition effect on elicited symbolic play in the controls. This result can be observed in figure 4.2.

To meet the final objective, a series of nonparametric and highly conservative correlation coefficients were computed, Kendall's Tau-B. Composite symbolic play scores, affect scores and attention scores were correlated, for each group in each condition. The results are demonstrated in table 4.4. It can be seen that in the music condition, all three variables were significantly correlated in the children with autism, but only affect and attention were correlated in the controls. In the control condition, symbolic play was correlated with affect and attention in the children with autism, but no relationships were apparent in the control group.

Table 4.3 By-Group Friedman Tests for the Effects of Music on Play

<i>Autism Group</i>		
<u>Variable</u>	<u>Friedman Test Statistic</u>	<u>probability</u>
Elicited Symbolic Play	0.3	0.6
Instructed Symbolic Play	0.3	0.6
Modelled Symbolic Play	0.3	0.6
Elicited Nonsymbolic Play	0.1	0.8
Instructed Nonsymbolic Play	0.7	0.4
Modelled Nonsymbolic Play	0.1	0.8
Instances of No Response	0.1	0.8
<i>Control Group</i>		
<u>Variable</u>	<u>Friedman Test Statistic</u>	<u>probability</u>
Elicited Symbolic Play	2.8	<b>0.05</b>
Instructed Symbolic Play	0.7	0.4
Modelled Symbolic Play	0.1	0.8
Elicited Nonsymbolic Play	0.0	1.0
Instructed Nonsymbolic Play	0.3	0.6
Modelled Nonsymbolic Play	0.3	0.6
Instances of No Response	0.7	0.4

NB for means, please refer to Table 4.2.

Table 4.4 By-Group and By-Condition Kendall Tau-B Correlation Matrices for  
Composite Symbolic Play Scores, Affect Scores and Attention Scores

<i>Autism Group</i>		
<u>Music Condition</u>	Symbolic Play	Affect
Symbolic Play		
Affect	0.39*	
Attention	0.45*	0.40*
<u>Control Condition</u>	Symbolic Play	Affect
Symbolic Play		
Affect	0.34*	
Attention	0.60**	ns
<i>Control Group</i>		
<u>Music Condition</u>	Symbolic Play	Affect
Symbolic Play		
Affect	ns	
Attention	ns	0.40*
<u>Control Condition</u>	Symbolic Play	Affect
Symbolic Play		
Affect	ns	
Attention	ns	ns
*p<0.05    **p<0.01    ns: not significant		

#### 4.4 Discussion

These results suggest that there is less symbolic generativity in children with autism (less elicited symbolic play). Also, these results suggest that there is an effect of music on the elicited symbolic play of children without autism, supporting the results of the introductory study reported in chapter two. However, there were no effects or interactions of group and condition to be found when ANOVAs were used. There were relationships between composite symbolic play scores and affect scores / attention scores, but they were specific to the autistic children.

The replication of the effect of the musical stimulus on the controls is important for obvious reasons. It would seem that the music being played signalled to the controls that more elicited symbolic play was appropriate, and that they should respond more often. This was not the case with the children with autism. A calming effect is possible, but the music was 'upbeat' in nature - it was not relaxing. Nevertheless we cannot discount a possible calming effect on the basis of the data.

The symbolic play of the children with autism reflected a generativity impairment which is in line with the findings of Lewis and Boucher (1995). There were also more occasions where the children with autism simply did not respond. It seems clear that children with autism respond well to the structured nature of instructed symbolic play, but when they need to produce their own ideas the situation does not afford symbolic behaviour.

There are two reasons why these findings fail to support the hypothesis that symbolic play is necessarily related to social factors. First, there were no interactions between group and condition as factors predicting symbolic and nonsymbolic play, when ANOVAs were used (see Appendix 4.2). On the other

hand, there was a significant effect of condition on the elicited symbolic play of the controls. This is limited evidence that symbolic play is affected by a musical stimulus, but only in non-autistic children.

The second reason why the hypothesis is not supported is that the correlations between symbolic play and affect, and symbolic play and attention, were only found in the autistic children. Whilst this may indicate something akin to the correlation of executive functions in autistic children (Ozonoff et al., 1991), it is poor evidence that symbolic play, affect and attention are necessarily related. Ozonoff, Pennington and Rogers (1991) suggest that the cognitive and emotional aspects of executive function may be *more* integrated in children with autism than in other children. It may be that this is also true of their perceived affective mood, their perceived attention-to-task, and their symbolic play.

Another finding which requires discussion is the surprisingly high number of symbolic play acts demonstrated by the children with autism. Josef Perner (1993, 1991) suggested that symbolic play entails 'acting-as-if' and is not metarepresentational in the same way as understanding the mental states of other people. Perner's challenge to Leslie is that both symbolic play and knowledge of mental states should be similarly delayed in children with autism, for Leslie's theory to be correct. Only about 20% of young children with autism could understand false belief in the definitive study carried out by Baron-Cohen, Leslie and Frith (1985). In contrast, seven out of the 13 (54%) children with autism in the present study demonstrated more than one symbolic idea in the music-present condition, and eight out of 13 (62%) did so in the music-absent condition. Therefore, either this particular group of children with autism is not comparable to those of previous studies (perhaps too old), or Perner is correct to suggest that symbolic play requires less than perception of mental states in other people.



The empirical chapters so far (chapters two, three and four) have examined the effects of an external stimulus on the affective, attentive and symbolic behaviour of children with and without autism. A problem with understanding symbolic play in the developing child is that the experimental design has been manipulative; we changed the context (included music) and this influenced symbolic play. To fully understand how affective mood and attention to the task relate to symbolic play, if they do at all, a more 'naturalistic' approach is needed. We need to consider the role of the natural variation of perceived affective mood and perceived attention-to-tasks in the symbolic play of children with autism.

As a prelude to examination of the relationships of affect, attention and symbolic play in chapter six, chapter five shall consider whether sufficient variation in affect and attention scores can be detected by the rating scale devised in chapter three, over several occasions. This variation must be detected if natural changes in affect and attention across time are to be investigated effectively. At this point we are assuming that such changes exist in reality.

## Chapter 5

### **Piloting the Affective Mood/Attention-to-Tasks Rating Scale in Children with Autism**

#### 5.1 Introduction

Before the possible interrelationship of symbolic play, affective mood and attention is further examined, it is important to establish whether day-to-day change in affect and attention can be detected using the rating scale developed thus far. Scores across several occasions should demonstrate either within-subject variation or between-subject variation in order for scores on any particular day to be viewed as meaningful. That is, we have to be sure that scores found on a particular day are representative of either between-subject variation, or within-subject variation, in affective mood and attention to task. In the present pilot study, such differences in the scores of children with autism were examined. This group of children was chosen since autism is a main theoretical focus of this thesis.

Perceived affective mood and perceived attention to tasks remain the variables to be measured via the scale. However, to emphasise daily changes rather than transient changes within a particular day, the scale was now applied to a whole day. It was to be filled out by teachers rather than raters (see 5.2). Previously, raters who had no prior experience with children with autism completed the scales, and scores applied only to the short play symbolic play session.

The intention in the present pilot study was to capture whether familiar adults would perceive day-to-day changes in affect and attention, as opposed to long-term or transient second-by-second changes. Thus the focus of investigation is limited to one kind of affective / attentional variation. It is simply impossible to address all

kinds of changes. However, teachers of children with autism had reported anecdotally that day-to-day emotional and attentional changes were noticeable in children with autism. They did also report other kinds of change in children with autism, and this must be taken into consideration. For example, some reported considerable effects of lunch on mood and attention!

Another purpose for examining day-to-day changes in the perceived affect and attention of children with autism is to investigate the importance of a dynamic model of symbolic life. In the previous study (Chapter 4), significant relationships between affective mood, attention to task, and symbolic play were found in autistic children. Adding day-to-day changes into this picture will have important implications for the current theoretical accounts of symbolic play and autism.

If differences are mainly observed *between* subjects, then one can conclude that the children differ, but an individual child's moods, attention and perhaps play, do not differ across time. This can be easily assimilated by a metarepresentational account of symbolic play, as representative of differing levels of delay in the symbolic ability of children with autism (see Baron-Cohen, 1989a).

However, if differences mainly occur *within* subjects, then day-to-day changes in affective / attentive life may be important in explaining the symbolic capacities of children with and without autism.

## 5.2 Method

*Participants.* Fourteen children with autism were selected from local special schools. All had received psychiatric diagnosis of autism (DSM-III-R: APA, 1987). Their mean receptive language age, measured via the Test for the Reception Of Grammar (TROG; Bishop, 1983), was 5.3 (standard deviation=2.6) and their mean chronological age was 9.3 (standard deviation=2.9). All but two of the children in this study had been used in the previous study. Another two boys were included in the study, and one girl was excluded at the request of her parents.

*Design and Procedure.* Again, affective mood and perceived attention-to-tasks were rated. However, there were a number of important changes to the design and use of the scale in the present study. First, the rating scale was completed by teachers, who were familiar with the children, at a time during the day when the children were not present. This was intended to both reduce disruption to normal classroom activity, and to improve the ecological validity of the observations.

Second, the rating scale itself was modified to represent the child's mood and attention to tasks across a whole day's classroom activity, rather than a single play episode. The modified version of the scale is presented in Appendix 5.1. It will be seen that the statements are essentially the same, with minor changes only to reflect the application of the scale to a whole day. For example, the statement "This child is simply happy" was changed to "This child has simply been happy today".

The five teachers, each of whom regularly taught the children in question, were first briefed about the rating which they would have to do, and then asked to participate. Teachers were given minimal written instructions on filling out three rating scales for each child (see Appendix 5.1). One scale was to be completed for each child for three consecutive days. It was explained that the purpose of the observations

would be fully detailed on debriefing, when the experimenter collected the completed scales. It was further explained that it was important that the teachers did not know the purpose of the observations while completing the scales. Four teachers rated three children each, with one teacher rating two children.

The experimenter collected the scales after the three days had passed. The teachers were then told that the study was intended to examine emotional and attentional changes which occur day-to-day.

### 5.3 Results

It was seen to be important to present the results for each subject in such a way as to reveal the extent of differences in the ratings of different teachers. Table 5.1 demonstrates the receptive language age equivalences, the expressive language information and grammar scores (Renfrew Action Picture Test; Renfrew, 1966), and the standard deviations of each participant's three affect and attention scores (as well as raw scores). These standard deviations are statistically crucial, because they demonstrate the participants' day-to-day variation in affect and attention scores.

It will be seen from Table 5.1 that the children differed considerably in how their scores varied from day to day in both affect and attention. This suggests that affective mood and attention to tasks do vary day-to-day in a way which can be reliably detected via the rating scale. Also, within-subject ranges of scores were often considerable, the largest standard deviations being 13.4 for affect and 12.5 for attention. Clearly, there is observable evidence for both within-subject variation of scores, and for between-subject differences. This could reflect either variation of affect and attention, or error of measurement. To find out which is the case it was necessary to examine the ratings of the different teachers for reliability.

Therefore the effects of the variables as predictors of each other were examined. A general linear model was used for this purpose, the particular model being that provided by Systat 5.2.1 (Systat, 1992). Two analyses were carried out initially. In the first of these, affective mood scores were statistically predicted by attention scores, and the teacher variable. In the second analysis, attention scores were statistically predicted by affect scores and by teacher.

Affect and attention scores were significantly predictive of each other (attention predicts affect;  $T=8.8$ ,  $p<0.01$ ; affect predicts attention;  $T=8.9$ ,  $p<0.01$ ).

However, the teacher variable was not significantly predictive of either (of affect;  $T=0.4$ ,  $p=0.7$ ; of attention,  $T=0.2$ ,  $p=0.8$ ). Analyses of variance to test for the significance of these regressions were highly significant (for first analysis,  $F=41.3$ ,  $p<0.01$ ; for second analysis,  $F=41.2$ ,  $p<0.01$ ).

To give the reader a statistical backdrop to these analyses, we can also consider a variable which we might *expect* to be significantly predicted by the teacher variable. For this purpose, the grammatical ability of the children was chosen. Children with autism were streamed according to communicative ability at the particular schools in question. As one might expect, grammar scores on the Renfrew Action Picture Test were significantly predicted by the teacher variable ( $T=-2.8$ ,  $p<0.05$ ) and also by affect and attention scores (affect;  $T=-3.2$ ,  $p<0.01$ ; attention;  $T=2.6$ ,  $p<0.03$ ). An analysis of variance to test for the likelihood of this regression was significant ( $F=6.0$ ,  $p<0.05$ ).

A similar analysis demonstrated that information scores on the Renfrew Action Picture Test, which reflect knowledge of vocabulary, were not significantly predicted by affect scores or attention scores (affect;  $T=-1.2$ ,  $p>0.05$ ; attention;  $T=0.6$ ,  $p>0.05$ ), or by the teacher variable ( $T=-1.8$ ,  $p>0.05$ ). Children with autism are often highly able in their knowledge of vocabulary, and this ability does not represent their communicative problems accurately (e.g. Jarrold, Boucher and Smith, 1993).

These results suggest that the ratings of the individual teachers were sufficiently reliable for differences in scores to be considered as within-subject differences and between-subject differences. The reader is advised to consider the standard deviations themselves as presented in Table 5.1. It can be seen that affect and attention standard deviations varied much more between subjects than between teachers.

Table 5.1 Ranges and standard deviations of each participant's affect and attention scores, receptive and expressive language ability

Child	Teacher	Affect		Attention		TROG (receptive) Age equivalence	Renfrew (expressive)	
		Range	SD	Range	SD		Information	Grammar
1	1	20	10.0	15	7.7	6	24.5	16
2	1	5	10.6	16	11.3	8	30	26
3	1	21	11.8	18	9.9	8	31	25
4	2	7	4.0	6	3.5	6	35	22
5	2	19	13.4	16	11.3	10	36	29
6	2	9	5.2	7	4.0	10	23.5	20
7	3	5	2.5	12	6.0	4.5	22.5	8
8	3	11	8.6	17	8.5	4.25	31	27
9	3	24	12.5	12	6.4	10	27	20
10	4	4	2.3	2	1.0	4.5	33	17
11	4	18	9.3	6	3.5	5.25	13.5	8
12	4	16	8.5	14	7.8	4	18	12
13	5	11	7.0	9	4.6	4	21.5	13
14	5	22	11.0	25	12.5	8	34.5	21

Furthermore, interesting correlations were found between the standard deviations and the language ability data. Children who demonstrated a high standard deviation of their three affect scores also tended to demonstrate a high standard deviation of their three attention scores ( $r=0.745$ ,  $p<0.01$ ). More interesting than this, children who demonstrated high standard deviations in attention scores tended to be more able in receiving language ( $r=0.707$ ,  $p<0.01$ ) and in expressing language with correct grammar ( $r=0.546$ ,  $p<0.05$ ). However, there was no significant correlation between ability to give correct *information* via language, and attention standard deviations. Standard deviations of affect scores were not significantly related to language ability. The participants' chronological ages did not correlate with the affect standard deviations or the attention standard deviations.



#### 5.4 Discussion

In this preliminary pilot study, considerable day-to-day variation in affect and attention scores was found both within- and between-subjects. This indicates that it is meaningful to investigate relationships of affective mood, attention to tasks and symbolic play, using this rating scale. Some subjects varied considerably in both affect and attention, some varied very little. Between-subject differences in the standard deviations of each participant's three affect and attention scores, were more marked than differences between teachers. The teacher variable, which was able to predict the grammatical ability of the children, could not predict standard deviations in affect or attention scores. Also, interesting correlations between increased language ability and increased variation in attention scores were found. Let us consider these findings in turn.

The findings regarding within-participant and between-participant differences in the three affect / attention scores confirm that teachers perceive daily changes in affective mood and attention to tasks, in children with autism. The degree of change varies from child to child. Therefore, it is meaningful to examine natural variations of this type, and their relationship to symbolic play, using the rating scale.

There are theoretical implications of these findings for symbolic play and associated affective / attentive factors in children with autism. Every affective or attentive score recorded on a particular day needs to be viewed as something which does not necessarily represent the child's long-term mood or attentional ability. It may only be true of that particular day. The importance of this finding is amplified by the relationships of affect, attention and symbolic play in autistic children, reported in 4.3.

The performance of children with autism on tests of symbolic play may not reflect their 'metarepresentational' ability, or at least not solely. Affective and attentive changes might have a role. As yet, we have no firm reasons to invoke the concept of interpersonal relatedness, rather than a model of computational metarepresentation.

However, we might suspect that Hobson's approach is useful when looking at affect and attention; Leslie's (1987) model of symbolic play does not focus on these factors. Some problems have already been identified with Leslie's approach, regarding the disparity of the capacity of children with autism for (1) symbolic play and (2) understanding the mental states of other people. However we certainly cannot whole-heartedly accept Hobson's arguments on the basis of the data presented here.

The correlation of the standard deviations of the attention scores with receptive language age equivalence, and expressive language grammar scores, is somewhat surprising. It may indicate secondary psychological problems of children with autism, who develop partial linguistic and social skills. Through frustration about partial social accomplishments these children may oscillate in their attention to social tasks.

Chapter 6 shall further examine the relationship of symbolic play, affective mood and attention to tasks on a single occasion. This can now be done with some confidence in the rating scale developed thus far. Affect and attention shall be assumed to be representative of other-perceived daily states of affective mood and attention-to-tasks. Assuming naturally-occurring changes in these variables, we can now examine a 'snapshot' of symbolic play, affect and attention.

## Chapter 6

### **An Observational Study of Symbolic Play, Affect and Attention in Children with Autism and Non-autistic Controls**

#### 6.1 Introduction

Daily changes in perceived affective mood and perceived attention to tasks, as well as individual differences, were shown in children with autism in the previous study (chapter five). Assuming that the rating scale can detect such changes, symbolic play, affect and attention can be examined on a particular occasion, with reasonable confidence that such scores reflect some degree of natural variation (within- and between-subjects).

It will be important in the present study to replicate two things. First, that the symbolic play of children with autism demonstrates inferior symbolic generativity to that of controls. Second, that there are relationships between affect, attention and symbolic play in children with autism.

Results of the second study to examine symbolic play (chapter four) demonstrated that *generativity* in symbolic play, rather than the ability to complete a symbolic act *per se*, underlies the problems of children with autism in symbolic play. The children with autism did not provide significantly fewer symbolic acts when symbols were provided in the form of instructions (instructed symbolic play). The profile of symbolic acts showed fewer responses from the children with autism, when the experimenter did not provide the idea whilst still encouraging the child to play (elicited symbolic play). This finding is in line with those of Lewis and Boucher (1995), who emphasise the importance of understanding the different forms of symbolic play when explaining symbolic impairments in autism. The

present study shall include examination of symbolic generativity for the purpose of further replication.

In addition, the present study shall further examine relationships of symbolic play, affective mood and attention to tasks. These were found in the second symbolic play study (chapter four) in the children with autism, but not in the mainstreamed controls. The replication of these relationships is of some import, since their occurrence has major theoretical implications. Simply stated, if these relationships occur, a theoretical account of autism which includes affective, attentive and symbolic elements will be the most adequate to explain symbolic play in autism. In effect, this will mean that the interpersonal relatedness approach to autism is superior to the metarepresentational approach, at least insofar as Leslie (1987) attempts to conceptualise symbolic behaviour in autism.

This procedure will have some elements in common with the control condition of the study reported in Chapter 4. However, there will be two crucial differences. The previous study included counterbalancing to avoid confounding effects of the order of condition. As a result half of the subjects will have already experienced the music condition by the time they experienced the control condition. This contaminates any comparison with the present study. This comprises the first difference.

The second difference is the choice of control subjects. At the time of the design of the present study, an important paper was published which outlined methodological issues in studies of emotion perception in children with autism (Hobson, 1991b). One of the issues which applies to the studies of this thesis is the importance of assigning appropriate controls. Hobson (1991b) points out that children who do not have autism but who have general intellectual delay, are more comparable to children with autism than younger children in mainstream education. This is

because general intellectual delay does not confound autism-specific impairments when controls also have such delays. The final two studies of the present thesis take account of this issue by including controls who do not have autism but who have general delay. Other studies of symbolic play which have used these controls have been shown to be methodologically superior to those which do not by Jarrold, Boucher and Smith (1993).

There is another methodological issue which is addressed in the design of the present study. In the first and second studies which included symbolic play tests (chapters two and four) two types of toy were included; realistic and non-realistic. However, it is not always clear whether 'realistic' toys can be viewed as 'symbolic' whenever a child engages in a behaviour which fulfils the criteria for metarepresentation (c.f. Leslie, 1987). In many cases, during the procedure of the previous play studies, 'functional' play which reflects the realistic characteristics of the play object was classed as non-symbolic. This was done to be conservative. However Lowe and Costello (1976) view functional play such as pushing a toy car as 'symbolic', since the child is pretending that the car has characteristics which it does not have (it is not a full-size car, it does not have an engine, etc.). To address this issue, the present study includes only non-realistic toys where this issue does not arise. To compensate for loss of statistical power, more non-realistic toys were included, than in previous studies (chapters two and four).

## 6.2 Method

*Participants.* Two groups of young people were chosen from local special schools; 14 children with autism and 14 children without autism who had general intellectual delay. The children with autism were the same group who had been seen in the previous study. All had received psychiatric diagnosis of autism (DSM-III-R, APA, 1987). The groups were matched for receptive language ability on the Test for the Reception of Grammar (TROG; Bishop, 1983). Expressive language was also measured for the purpose of additional information, using the Renfrew Action Picture Test (Renfrew, 1966). Table 6.1 shows the gender, chronological age (CA), and language abilities of the two groups. A series of one-way analyses of variance failed to show any significant group differences in receptive language age equivalence, or expressive language information or grammar scores.

*Materials.* Six non-realistic toys were presented to the children. It was not immediately obvious that these objects were for play. In order for the children to know that the toys were for play, a teddy bear was also included although the teddy was not considered a test item in itself. The toys were; some blocks, a piece of rubber, a piece of tubular plastic, a short stick, some felt, and some playdough.

Affect and attention were measured by the rating scale developed in the first, second and third empirical chapters (Chapters two, three and four), and further refined in the pilot study of the previous chapter (Chapter five). The scale was not changed in design from that detailed in Appendix 5.1, only in the manner of its use, described below. It will be remembered that minor changes had been made to the scale in order to assess the child's affective mood and attention to tasks across a whole day rather than a single play session.

Table 6.1 Gender, chronological age, receptive language age equivalence and expressive language scores

	Gender		CA	TROG	Renfrew	
	Girls:Boys				Information	Grammar
Autism	3 : 11	Mean	9.3	5.3	27.2	18.9
(n=14)		SD	2.8	2.2	6.8	6.8
Controls	6 : 8	Mean	10.0	4.6	23.1	15.8
(n=14)		SD	1.7	0.9	5.2	6.7
Independent Factor			Group			
Dependent Factors			Symbolic Play <ul style="list-style-type: none"> <li>- elicited</li> <li>- instructed</li> <li>- modelled</li> <li>- instances of no play</li> <li>- composite score</li> </ul>			
			Rated Affect			
			Rated Attention			

*Procedure.* The observer first spent about 30 minutes in each class prior to testing. Each child was then tested individually for symbolic play and manipulative play in a quiet area of the school. The experimenter and the child sat at a low table facing each other.

Each child was shown the teddy. The observer explained that it was soon to be teddy's birthday party. The child was then asked 'What can teddy use the blocks for in his birthday party?' (the elicited play condition). If the child exhibited

symbolic play, s/he was scored as showing "elicited" symbolic play, and the experimenter moved on to the next item of material. If the child did not exhibit symbolic play, the experimenter gave the instructed play condition with the same material - 'Show me how teddy could make a table with these blocks'. If the child exhibited symbolic play (constructed a table), s/he was scored as showing "instructed" symbolic play, and the experimenter moved on to the next item of material. If not, the experimenter would give the modelled play condition with the same material - 'I shall do it first. Can you copy how I do it?'. If symbolic play was produced at this point, the child was scored as having shown modelled play. In any case, the experimenter moved on to the next item of material. This process was continued for each toy in the order listed above, until each of the six had been used. Full instructions for the play task can be observed in Appendix 6.1.

For each item used, the child was also scored for manipulative play. If the child showed symbolic play, s/he was credited with manipulative play too, since symbolic play entails manipulative play. For example, if a child was able to pretend that the blocks were a 'chair' in the elicited condition, "elicited" was recorded for both symbolic and manipulative play. On the other hand, if the child used the blocks to bang the table in the elicited condition, but did not use them to make a table until the modelled condition, "elicited" would be recorded for manipulative play, but "modelled" would be recorded for symbolic play.

A rater familiar with the child was recruited from the school staff, and asked to observe the session. After the child had been tested for play, the child was taken back to the classroom, and the experimenter and the rater filled out the rating scale. The rater was not aware of the nature of the scale. One scale was filled out by the experimenter and one by the rater, immediately on completion of the symbolic play test, for each child tested. This was done in relative silence in an area to which the child had no access. The rater received no formal training in the use of the rating



scale, and were only asked to "indicate how much you agree that each of the statements accurately describes the child today". After all the chosen children were tested, the rater was thanked and debriefed about the nature of the experiment.

For analysis, symbolic play data were treated in two ways. First, by assigning scores reflecting the order: elicited (3 points), instructed (2 points), modelled (1 point), no play (0 points). This was necessary for the building of a composite symbolic play score for each child. Second, by tallying the frequency of occurrence of each of four play categories (elicited, instructed, modelled, no play). Thus the range of possible composite scores for symbolic play was between 0 and 18. Each of the frequency variables (elicited symbolic, instructed symbolic, modelled symbolic, and no play) could range between 0 and 6.

As in previous studies, play was judged to be symbolic if the child either (1) referred to an absent object or objects, (2) attributed properties to an object which it did not have, and/or (3) used an object as if it were another object or objects (c.f. Leslie, 1987).

### 6.3 Results

To examine inter-rater reliability between experimenter and observer ratings of affect and attention, intraclass correlation coefficients (ICC 2.2 : Shrout and Fleiss, 1979) were calculated across the 28 subjects. This yielded results of  $r=0.90$  for affect and  $r=0.87$  for attention, indicating that the experimenter and observer ratings were sufficiently reliable to be averaged and considered as a single measure.

The pattern of symbolic acts can now be considered. Table 6.2 demonstrates the results of Mann-Whitney U tests on each category of play (the nonparametric equivalent of between-groups one-way analysis of variance; ANOVA analyses may be viewed in Appendix 6.2). It will be seen that no significant results were found. The result that elicited symbolic play is relatively impaired in children with autism, is not replicated by these results. This can also be seen in figure 6.1. The mean number of instances of no response by group, is also shown graphically, in figure 6.2.

Table 6.2 Mann-Whitney U Tests for Group Differences in Play

<u>Variable</u>	<u>Mean:</u> <u>Autistic Group</u>	<u>Mean:</u> <u>Control Group</u>	<u>U</u>	<u>p</u>
Elicited Symbolic Play	3.0	3.3	85.0	0.5
Instructed Symbolic Play	1.4	1.4	93.0	0.6
Modelled Symbolic Play	0.2	0.6	78.0	0.7
Elicited Nonsymbolic Play	4.0	4.7	71.0	0.2
Instructed Nonsymbolic Play	0.2	0.1	92.0	0.5
Modelled Nonsymbolic Play	0.1	0.0	91.0	0.3
Instances of No Response	1.6	0.9	109.5	0.6

As in the study reported in chapter four, Kendall's Tau-B correlations were computed to test for relationships between composite symbolic play scores, affect scores and attention scores. The results can be observed in table 6.3.

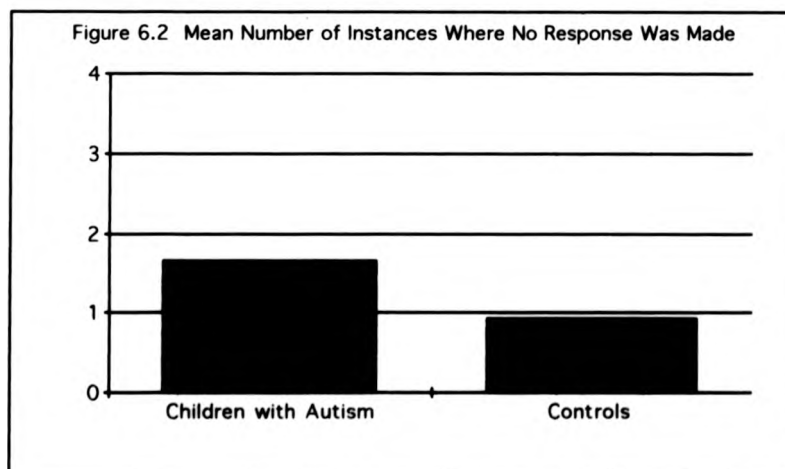
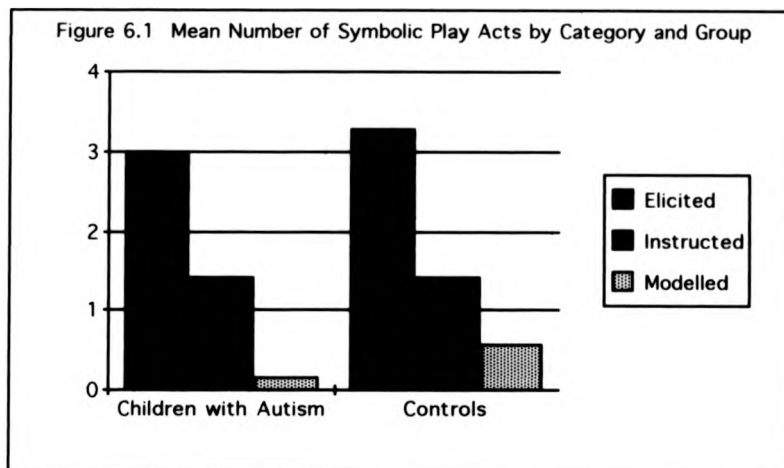


Table 6.3 By-Group Matrices of Kendall Tau-B Correlations Between Symbolic Play Scores, Affect Scores and Attention Scores

<i>Autism Group</i>		
	Symbolic Play Score	Affect Score
Symbolic Play Score		
Affect Score	0.66**	
Attention Score	0.42*	0.52**

<i>Control Group</i>		
	Symbolic Play Score	Affect Score
Symbolic Play Score		
Affect Score	0.41*	
Attention Score	ns	0.50*

\* $p < 0.05$

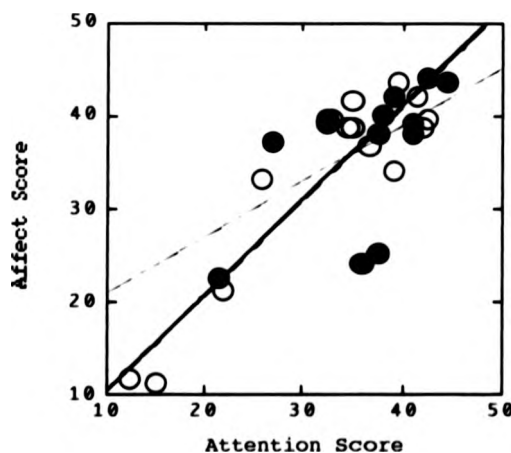
\*\* $p < 0.01$     ns = not significant

It will be seen that symbolic play scores and affect scores were highly correlated in both groups, as were affect scores and attention scores. However, attention scores were only correlated with symbolic play scores in the children with autism. These results suggest that perceived affective mood is related to overall symbolic play levels in children with and without autism. However, these results suggest that perceived attentiveness to tasks is strongly related to symbolic play in children with autism, in a way that it is not in children without autism.

These relationships can be viewed visually by means of scatterplots. Figure 6.3 demonstrates the relationship between affect scores and attention scores. Figure 6.4 consists of two plots, one demonstrating the relationship of symbolic play scores to affect scores and the other demonstrating the relationship of symbolic play scores to attention scores. It can be seen that the symbolic play data is somewhat skewed, and this recommends the use of Kendall's Tau correlations. On viewing figure 6.4 it will be seen that the lack of any group difference in elicited symbolic play might be due to ceiling effects. However, it is also clear that at least the lower half of the distribution is present. The use of Kendall's Tau correlations is some protection for the validity of the relationships shown in Table 6.3. On the other hand, it does seem that some two or three children in the autistic group were bored with the task (low attention), did not enjoy it (low affect) and did not do very well (low symbolic play score).

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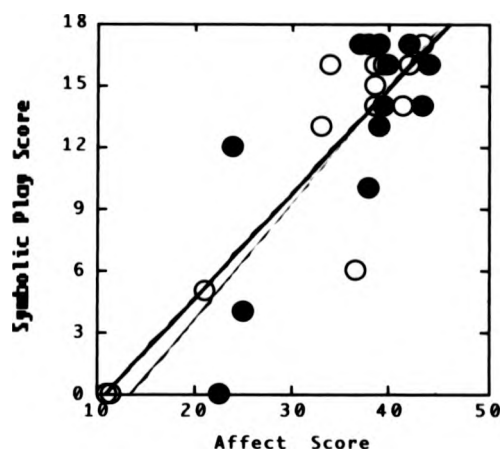
Figure 6.3 The Relationship of Affect and Attention Scores



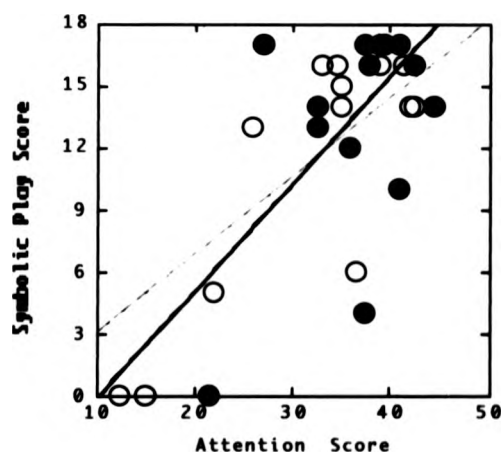
The open circles and the steeper regression line refer to the autism group, the filled circles and the less steep regression line to the control group.

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Figure 6.4 Plots showing the Relationship of Symbolic Play Scores to Affect Scores and Attention Scores



The open circles and the less steep regression line refer to the autism group, the filled circles and the steeper regression line to the control group.



The open circles and the steeper regression line refer to the autism group, the filled circles and the less steep regression line to the control group.

#### 6.4 Discussion

In the previous chapter (Chapter five), a rating scale detected between-subject and within-subject variation in day-to-day affective mood and attention-to-tasks, in children with autism. Using this scale, and a test of symbolic play with non-realistic toys, an attempt was made to combine study of symbolic play, affect and attention. Children with autism and controls with general intellectual delay were examined. No significant group differences in symbolic play were found. However, there were relationships between composite symbolic play scores, affect scores and attention scores found in the autistic children. In the controls, no relationship between attention scores and composite symbolic play scores was found, although affect was significantly related to symbolic play.

The results comprise some evidence of a relationship between affect and symbolic play, and further support for the idea that the relationships between affect, symbolic play and attention might be more related in children with autism (c.f. Ozonoff et al., 1991).

However, there are difficulties in choosing between the metarepresentational and interpersonal approaches. Although affect was related to symbolic play in both groups, no symbolic play impairment was found in the autistic children, which is not consistent with the literature (e.g. Lewis and Boucher, 1995). This casts considerable doubt on the reliability of the data. Therefore we need to be cautious about seeing the correlations as evidence of superiority of the interpersonal approach.

The lack of a symbolic play impairment may have been due to the ceiling effect which was observed in the distribution of symbolic play score. The ceiling effect might be addressed in a future study by the use of less linguistically able subjects.

A major difference between the study presented in chapter four and the present study was the choice of control group. Hobson (1991b) points out that it is important to

avoid the confounding effect of general intellectual delay, when trying to identify autism-specific impairments. It may be that some of the impairment identified in chapter four was due to such delay.

The relationships between affect, attention and symbolic play in the children with autism confirmed those reported in chapter four. A notable result was the significant relationship between attention scores and composite symbolic play scores which was specific to the children with autism. It is not a new suggestion that autism is a disorder of attention (e.g. Dawson and Lewy, 1989). However this does not help us choose between the two theories because of the suspicious nature of the data.

Bearing in mind the need for less able subjects, we might also require a new perspective on affect and attention which is less dependent on the subjective perceptions of raters - which is actually as much about the observer as the observed. Reliability was acceptable, but it is less clear about what was rated - it may simply have been the co-operativeness of the child. On the other hand there was evidence of face validity in chapter 3. We might look at other measures of affect and attention and see if the same relationships with symbolic play emerge.

A highly specific hypothesis can now be proposed, to test the interpersonal relatedness account of symbolic play. The amount of attention directed at the experimenter's face during a test of symbolic play should be less than that of controls, if the theory is correct. The rationale for this is that symbolic play tests are good examples of potential 'relatedness triangles' (c.f. Hobson, 1993). In children with autism, an important part of interpersonal relatedness, attunement to the facial expression of the other, should be missing within such a relatedness triangle. This suggestion shall form the basis of the final empirical study of this thesis (Chapter seven).



Two aims can be set forward for this final empirical study. First, an attempt should be made to replicate the finding that symbolic generativity, inherent in elicited symbolic play, is not impaired in children with autism. Second, to confirm whether an interpersonal relatedness account of symbolic play in autism can be made, the attention of children with autism to the facial expression of the experimenter should be examined, during a test of symbolic play. This might confirm whether such a situation is a form of 'relatedness triangle' itself.

## Chapter 7

### **The Symbolic Play Test as a 'Relatedness Triangle'; the Importance of Social Attention in Autism**

#### 7.1 Introduction

In the previous study (chapter six) it was shown that the social attention of children with autism is different from that of controls. Symbolic play scores were correlated with perceived attention-to-tasks, only in the children with autism, not in the controls. However because there was a lack of any symbolic play impairment in the autistic children it was concluded that the data should be viewed with caution.

Two objectives were suggested at the end of chapter six for the present study. First, it was seen to be important to test again the suggestion of Lewis and Boucher (1995) that the symbolic play of children with autism reflects poor generativity. Inconsistent results have been found so far. In chapter four, the children with autism demonstrated significantly poorer symbolic generativity than controls, but in chapter six, this finding was not replicated. This may have been due to ceiling effects in the symbolic play data. Also, the symbolic play tests used were different; six items in the latter study (chapter six), with eight items in the former study (chapter four).

In addition, the study reported in chapter six included control participants who were more comparable to children with autism, than the controls of the study reported in chapter four. The controls in chapter six did not have autism but had general intellectual delay. The controls in chapter four were younger children in mainstreamed schools. Furthermore, 'realistic' toys were used in the former study, but not in the latter study. This type of toy invites theoretical confusion between

symbolic play and 'functional' play. Authors currently disagree upon this issue (c.f. Lewis and Boucher, 1988).

However it was suspected that the most likely explanation for the lack of group difference in symbolic generativity in the previous study, was that the children's relatively high receptive language ability led to a ceiling effect. Therefore, the groups in the present study were very closely matched for both receptive and expressive language ability, and less able children were selected.

The main aim of the present study is to examine the symbolic play test as a 'relatedness triangle'. It is hoped that this will clarify whether the interpersonal relatedness approach can be applied to the symbolic play situation itself. Hobson (1993) suggested that this situation includes important elements of primary intersubjectivity (interpersonal relations) which are important for the development of secondary intersubjectivity (e.g symbolic behaviours). With this in mind, the specific hypothesis is that the children with autism will demonstrate poor attention to the facial expression of the experimenter.

If the amount of attention directed to the experimenter is less in the children with autism than in the controls, and a symbolic impairment is found, then it will be possible to view the symbolic play test not only as a test of symbolic acts, but also as a test of interpersonal relatedness itself. Although this does not necessarily exclude metarepresentational approaches when attempting to explain symbolic play and autism, it highlights the inclusive nature of the interpersonal relatedness metaphor, and the narrow focus of Leslie's (1987) original thesis on computational cognition.

In 1.4.4 studies by Mundy, Sigman and colleagues were discussed (Mundy, Sigman and Kasari, 1990; Mundy, Sigman, Ungerer and Sherman, 1986, 1987;

Sigman, Mundy, Sherman and Ungerer, 1986) which examined 'referential looking' during tests of 'joint-attention' in young children with autism. It was found consistently across these studies that children with autism demonstrated significantly fewer looks towards the experimenter's face, when both the experimenter and the child were engaged with a toy. In contrast, eye contact between child and experimenter was relatively common if the child was engaged in a 'physical' tickling game, and when the child needed to gain the aid of the experimenter when the toy was out of reach.

It can be argued that the potentially symbolic referent (the toy), the experimenter and the child comprised a 'relatedness triangle' which was relatively poorly formed in the children with autism. The tickling-type game did not have the element of the symbolic referent (the toy), and the requesting behaviour was purely to gain the toy. The requesting behaviour only required the perception of the experimenter's physical (or possibly visual) perspective on the toy, not their mental perspective.

The joint engagement with the toy, on the other hand, invited perception of the experimenter's attitude towards the toy, and hence the potential for symbolic play. Bear in mind that interpersonal relatedness is, in this approach, a prerequisite for symbolic behaviour. However, symbolic play was not the focus of the studies by Mundy, Sigman and colleagues.

The present study seeks to extend the findings of previous studies by examining symbolic play and social attention on three separate occasions. Because of this, methodological changes to the play test are necessary to avoid effects of exposure to the procedure.

## 7.2 Method

*Participants.* Ten children with autism and 10 controls with general intellectual delay were selected from local special schools. The children had all been used in the previous study, but there was a long gap between the studies (some four months). The autistic children had received psychiatric diagnosis of autism (DSM-III-R; APA, 1987). Table 7.1 details their gender, chronological ages, receptive language age equivalences and expressive language scores. The present design included repeated measures of symbolic play, manipulative play, attention and affect. The children were seen on three occasions. On the first occasion receptive language was assessed by the Test for the Reception of Grammar (TROG; Bishop, 1983) and on the second occasion, expressive language was assessed by the Renfrew Action Picture Test (APT; Renfrew, 1966). On all three occasions, subjects were given the play task and were videotaped in order to assess their social attention.

In line with the methodological conclusions reached in 6.4, these groups were very closely matched and chosen for relatively low receptive language age equivalence, expressive language scores, and chronological age. This entailed the exclusion of four participants, two from each group, to ensure close compatibility of the groups, in spite of the otherwise appropriate linguistic abilities of these children. These exclusions were in addition to those children excluded because their receptive language age equivalence fell lower than the range detected by the TROG.

Table 7.1 Gender, chronological age, receptive language age equivalence and expressive language scores

	Gender		CA	TROG	Renfrew	
					Information	Grammar
	Girls:Boys					
Autism	2 : 8	Mean	8.1	4.6	23.4	12.3
(n=10)		SD	1.0	0.9	6.6	5.7
Controls	3 : 7	Mean	8.6	4.7	22.0	15.3
(n=10)		SD	0.8	0.8	5.4	6.4
Independent Factors			Group			
			Occasion			
Dependent Factors			Symbolic Play	- elicited - instructed - modelled - no play - composite score		
				Seconds attending to experimenter		

*Materials.* A Video Camera (JVC), Recorder (Panasonic) and tripod were used to record the children playing on each occasion. The children were presented with a teddy on all occasions, with a set of two additional non-realistic toys; either (1) a set of blocks and a piece of tubular plastic, (2) a piece of rubber and some felt, or (3) a short stick and some playdough. The toy items were presented in twos to allow for a procedure which included counterbalancing. None of the children indicated distress at the presence of the video, but some who were interested were allowed to view themselves through the viewfinder after they had completed the procedure on the third occasion.

*Procedure.* On each occasion the children were shown the teddy. The experimenter said, "What can teddy do with this / these?" and showed the child the first toy (elicited symbolic play being potentiated). If the child played with the toy, either symbolically, or non-symbolically, this was recorded. If symbolic play was recorded, the experimenter said "What else can teddy do with this / these?" beginning the procedure again. If symbolic play was not recorded, the experimenter instructed symbolic play; for example, "Show me how teddy could build a table with these blocks." If symbolic play was recorded at this stage, the experimenter said "What else can teddy do with this / these?", beginning the procedure over. If symbolic play was not recorded at this stage, the experimenter modelled symbolic play, saying "I shall do it first. Can you copy how I do it?". Whether or not symbolic play was recorded at this stage the experimenter said "what else can teddy do with these?", beginning the procedure over. Full instructions can be seen in Appendix 7.1.

This procedure was repeated until either the child had demonstrated symbolic play with the toy three times, or the experimenter had failed to elicit modelled symbolic play after the third attempt to elicit symbolic play with the second toy. Then the entire procedure was repeated for the second toy item. The theoretical range of symbolic acts was 0-6 (a maximum of six acts of symbolic play on elicitation, three for each toy).

The experimenter tallied the frequency of occurrence of each of four play categories (elicited, instructed, modelled, no play). The data on non-symbolic play were also tallied. For the purposes of correlations, composite scores were built from these frequencies as in previous studies (3 for elicited play, 2 for instructed play, 1 for modelled play). Thus the range of possible scores for symbolic and manipulative play was between 0 and 18.

Social attention was examined by means of a video recording of the play sessions. A thirty-second sample, of the number of seconds the child looked at the experimenter's face, began after the *second* attempt by the experimenter to elicit symbolic play. The second attempt at elicitation was chosen in preference to the first to avoid primacy effects. Measurements were taken to the nearest half-second.

A number of additional background variables were included for further information. These were the number of smiles shown in each sample, the number of seconds spent smiling, the number of seconds spent looking at the toy, and the number of seconds spent looking at neither the toy nor the experimenter.



### 7.3 Results

The first results to be considered were the differences between the groups in play. Table 7.2 demonstrates the results of within-occasion Mann-Whitney U tests for group differences in play. It will be seen that the only significant difference was in elicited non-symbolic (functional and manipulative) play, on the third occasion, with more of this type of play being demonstrated by the children with autism. These results do not support the findings of chapter four, that symbolic generativity is specifically impaired in children with autism.

The next results to be considered were group differences in social attention. It was not considered necessary to test this measure for reliability, as it is based upon actual full half-seconds of directed gaze rather than estimation of 'state' by raters (although with hindsight it would have strengthened objectivity of the measure). Table 7.3 shows the results of within-occasion Mann-Whitney U tests for group differences in the number of seconds spent looking at the experimenter's face. Background variables are included which reflect the child's affect (number of smiles, number of seconds smiling) and attention not directed at the experimenter (number of seconds attending to toy, number of seconds attending to neither the toy nor the other).

It will be seen that on the first occasion, the groups were not significantly different from each other in any variable. However, on the second occasion, the children with autism demonstrated fewer smiles than the controls, and spent fewer seconds smiling. Most importantly for this study they spent significantly less time looking at the experimenter. On the third occasion, the children with autism spent fewer seconds smiling, and spent more time looking at neither the experimenter nor the toy, than controls. Again, they spent less time looking at the experimenter. These results suggest that there is an impairment in social attention (and affect) in children with autism, although this need not be apparent in an initial symbolic play situation (i.e. on the first occasion).

Table 7.2 Mann-Whitney U tests for Group Differences in Play on Each Occasion

<i>Occasion 1</i>				
<u>Variable</u>	<u>Mean: Autism</u>	<u>Mean: Control</u>	<u>U</u>	<u>p</u>
Elicited Symbolic Play	1.7	2.0	39.5	0.4
Instructed Symbolic Play	1.9	2.1	47.5	0.8
Modelled Symbolic Play	0.4	0.4	58.0	0.5
Elicited Nonsymbolic Play	0.9	0.6	60.5	0.4
Instructed Nonsymbolic Play	0.4	0.3	51.0	0.9
Modelled Nonsymbolic Play	0.1	0.1	50.0	1.0
Instances of No Response	0.6	0.6	46.0	0.7
<i>Occasion 2</i>				
<u>Variable</u>	<u>Mean: Autism</u>	<u>Mean: Control</u>	<u>U</u>	<u>p</u>
Elicited Symbolic Play	2.0	2.7	37.5	0.3
Instructed Symbolic Play	1.1	1.8	36.0	0.3
Modelled Symbolic Play	0.4	0.5	53.0	0.8
Elicited Nonsymbolic Play	0.8	0.4	61.0	0.4
Instructed Nonsymbolic Play	0.5	0.2	61.0	0.3
Modelled Nonsymbolic Play	0.0	0.0	50.0	1.0
Instances of No Response	1.2	0.4	70.0	0.1
<i>Occasion 3</i>				
<u>Variable</u>	<u>Mean: Autism</u>	<u>Mean: Control</u>	<u>U</u>	<u>p</u>
Elicited Symbolic Play	1.9	2.6	40.0	0.4
Instructed Symbolic Play	1.0	2.1	33.5	0.2
Modelled Symbolic Play	0.7	0.2	62.0	0.3
Elicited Nonsymbolic Play	1.0	0.1	80.5	<0.01
Instructed Nonsymbolic Play	0.2	0.3	50.0	1.0
Modelled Nonsymbolic Play	0.5	0.1	65.5	0.1
Instances of No Response	0.7	0.4	59.0	0.4
<i>All Occasions</i>				
<u>Variable</u>	<u>Mean: Autism</u>	<u>Mean: Control</u>	<u>U</u>	<u>p</u>
Elicited Symbolic Play	5.6	7.3	35.0	0.2
Instructed Symbolic Play	4.0	6.0	34.0	0.2
Modelled Symbolic Play	1.5	1.1	61.0	0.4
Elicited Nonsymbolic Play	2.7	1.1	74.5	0.1
Instructed Nonsymbolic Play	1.1	0.8	62.5	0.3
Modelled Nonsymbolic Play	0.6	0.2	53.0	0.8
Instances of No Response	2.5	1.4	67.0	0.2

NB ANOVA analyses were also carried out (see Appendix 7.3).

Table 7.3 Mann-Whitney U Tests for Group Differences in Number of Seconds Attending to the Experimenter, and Background Affective and Attentive Variables, on Each Occasion

<i>Occasion 1</i>				
<u>Variable</u>	<u>Mean: Autism</u>	<u>Mean: Control</u>	<u>U</u>	<u>p</u>
No. of Seconds Attending to Experimenter	12.9	13.9	46.0	0.8
Background Variables:				
No. of Smiles			66.0	0.2
Seconds Smiling			42.5	0.6
Seconds Attending to Toy			46.0	0.8
Seconds Attending Elsewhere			63.0	0.3
<i>Occasion 2</i>				
<u>Variable</u>	<u>Mean: Autism</u>	<u>Mean: Control</u>	<u>U</u>	<u>p</u>
No. of Seconds Attending to Experimenter	6.7	14.6	12.5	<0.01
Background Variables:				
No. of Smiles			20.5	<0.03
Seconds Smiling			16.0	<0.02
Seconds Attending to Toy			46.0	0.8
Seconds Attending Elsewhere			73.0	0.1
<i>Occasion 3</i>				
<u>Variable</u>	<u>Mean: Autism</u>	<u>Mean: Control</u>	<u>U</u>	<u>p</u>
No. of Seconds Attending to Experimenter	6.1	14.1	18.0	<0.02
Background Variables:				
No. of Smiles			33.5	0.2
Seconds Smiling			12.0	<0.01
Seconds Attending to Toy			28.5	0.1
Seconds Attending Elsewhere			84.5	<0.01
<i>All Occasions</i>				
<u>Variable</u>	<u>Mean: Autism</u>	<u>Mean: Control</u>	<u>U</u>	<u>p</u>
No. of Seconds Attending to Experimenter	25.7	42.6	18.0	<0.02
All Background Variables ns across all occasions				

**NB** ANOVA analyses were also carried out (see Appendix 7.3).

A series of Friedman Tests were carried out within-groups, to test for the effects of occasion on each variable. However, none of these test results were significant. These particular results may be viewed in Appendix 7.2. However, it is clear that group differences were not so marked on the first occasion, since group differences were not significant.

It is important to consider the symbolic play data in relation to the number of seconds spent looking at the experimenter. Figure 7.1 shows the number of seconds spent engaged in this behaviour, by occasion and group. Figures 7.2, 7.3 and 7.4 demonstrate the mean number of acts of elicited symbolic play, instructed symbolic play, and modelled symbolic play, by group. Each of these last three figures represents a single occasion.

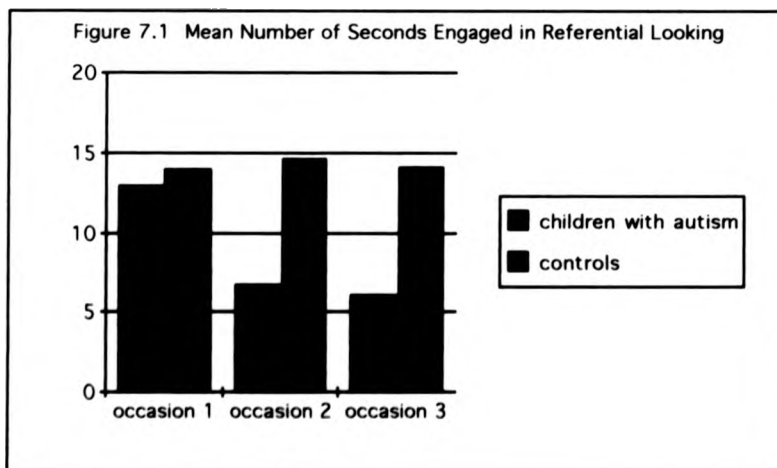


Figure 7.2 Mean Number of Symbolic Play Acts by Category &amp; Group; Occasion 1

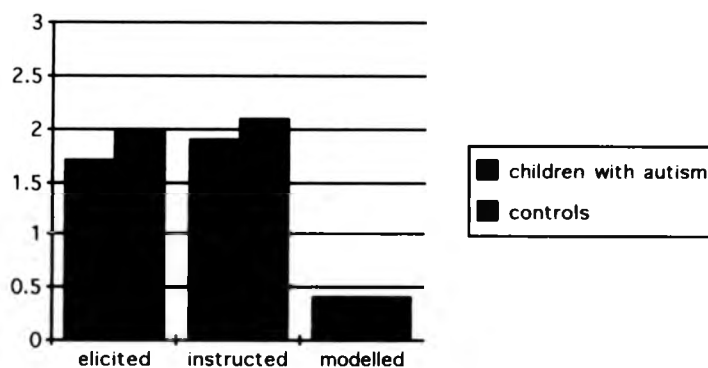


Figure 7.3 Mean Number of Symbolic Play Acts by Category &amp; Group; Occasion 2

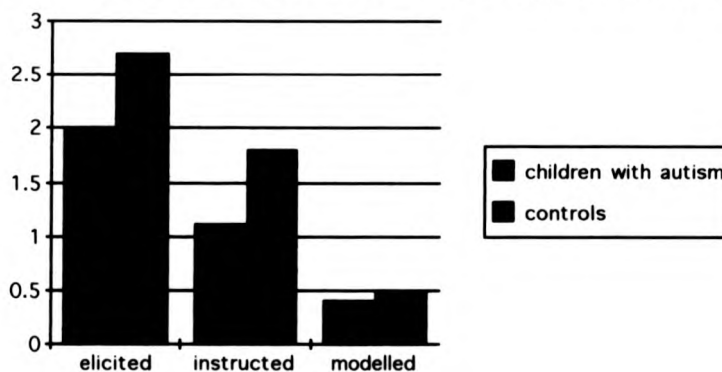
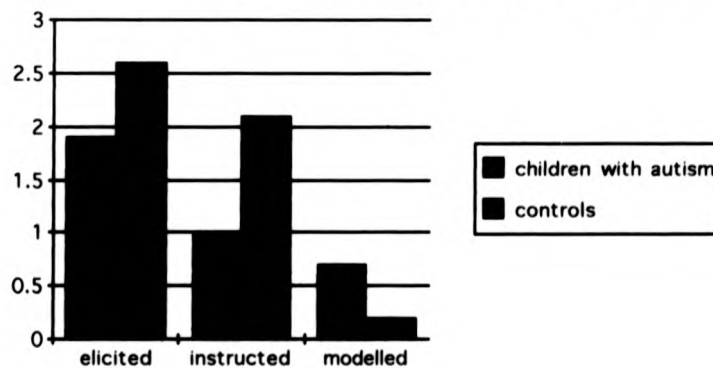


Figure 7.4 Mean Number of Symbolic Play Acts by Category &amp; Group; Occasion 3



By-group Kendall's Tau-B correlations were computed for each occasion, between composite symbolic play scores and the number of seconds spent looking at the experimenter. No significant relationships were observed.

In sum, the children with autism did not demonstrate significantly less elicited, instructed and modelled symbolic play than controls. However, in a symbolic play situation they demonstrated less attention to the experimenter after the first occasion. There were no significant correlations between symbolic play and attention directed to the experimenter.

#### 7.4 Discussion

This study complements the findings of previous studies in two main ways. First, no significant group differences in the elicited symbolic play of children with autism and controls were found. Second, in line with studies of joint-attention behaviours, the children with autism were found to look at the experimenter less often than controls in the symbolic play test situation, in two out of three occasions. These findings shall be considered in turn.

In previous studies the elicited symbolic play of children with autism has been poorer than controls (for a review, see Jarrold, Boucher and Smith, 1993). In this respect the findings of the present study are peculiar. However, if we view figures 7.2, 7.3 and 7.4 we can see that group differences in means were more marked on the second and third occasions. A generativity impairment was supported by the findings of chapter four, but not by those of chapter six, where there was a ceiling effect. An important difference between those studies was the inclusion of younger mainstreamed controls in the former, and the inclusion of controls without autism who had general intellectual delay, in the latter.

A generativity impairment was identified when children with autism were compared with chronologically younger mainstreamed children. It was not identified when comparison was made with children without autism who had general intellectual delay. The groups of children included in the present study are very close in receptive and expressive language ability, and in the present study both groups were less able in linguistic ability than the groups described in Chapter 6.

The issues regarding appropriate controls have borne out the review of methodological issues in the study of emotion perception in autism, by Hobson (1991b). It is possible that general delay is at the heart of any symbolic generativity

impairment, on the basis of the present results (although the findings of Lewis and Boucher, 1995, contest this). Possibly, a phenomenon of a continuum of 'specific' and 'general' delays blurs the issue.

A final issue in the findings regarding symbolic play is the lack of use of realistic toys in both the present study and the previous study. It is possible that these studies are 'blunted' to a generativity impairment because non-realistic toys are inherently more difficult to use as symbolic toys. This would not seem likely, given that Lewis and Boucher (1988) reported that non-realistic toys invited more symbolic play than realistic toys, which themselves invite functional non-symbolic play.

The central hypothesis of the study was that a symbolic play impairment would correspond to an impairment in social attention. The results do not support this hypothesis because (1) the study did not detect a symbolic play impairment, and (2) because there was no relationship between composite symbolic play score and the number of seconds spent looking at the experimenter. Therefore, this study failed to demonstrate that a non-spontaneous symbolic play situation can be viewed as a 'relatedness triangle'.

The studies presented in the thesis have failed to be convincing about the role of attentional and affective factors in symbolic play. There are two alternative possibilities why this is the case. First, it is possible that the studies were methodologically flawed. Jarrold et al. (1993) point out that many studies of symbolic play in autism can be criticised on methodological grounds, and certainly many of the methodological issues apply to the studies presented here. Especially suspicious is the lack of any symbolic play impairment in the autistic children. These issues shall be further explored in the following general discussion chapter.



Second, it may be that affective / attentive factors are not central to the failure of autistic children to play in symbolic ways. Leslie and Frith (1990) suggest that any affective disorder which can be observed in autistic children is secondary to their cognitive impairments. This remains a strong possibility.

## Chapter 8

### **General Discussion**

There will be two main themes in this general discussion chapter. First, it is important to clarify and explore the methodological issues of the empirical studies, in order to evaluate their contribution to current research into symbolic play and autism. Second, with these methodological issues in mind, it is hoped that a number of theoretical implications will be apparent. These theoretical implications will be drawn from both other research and theory, and the findings of the empirical studies.

#### **8.1 Empirical Findings in Brief**

In chapter two, a preliminary study examined the effect of a musical stimulus on the symbolic play of preschool children. An effect of the music was found; the children demonstrated more elicited symbolic play when a musical stimulus was included.

Chapter three traced the development of a rating scale designed to measure affective mood and attention-to-tasks. Adequate face validity was estimated, and the scale piloted during the study reported in chapter two. However, results were limited by the fact that there was only a single rater.

The following study (chapter four) examined the effect of a musical stimulus on the symbolic play of children with autism, and that of younger children from mainstream education. The groups were comparable in terms of their receptive language ability. Although an effect of the musical stimulus was found in the elicited symbolic play of the controls, no such effect was found in the children with

autism. However, no interaction between group and condition was found using ANOVA analyses (c.f. Appendix 4.2). It was concluded that the evidence that music had an effect specific to the control group was limited.

With the effect of a musical stimulus replicated in the control subjects of this study, it was then possible to examine relationships of affective mood, symbolic play, and attention to tasks. Significant relationships between composite symbolic play scores and attention scores, and symbolic play scores and affect scores, were only observed in the children with autism. These relationships may be analogous to the relationships between emotion perception and theory of mind ability, suggested by Ozonoff, Pennington and Rogers (1991).

However, relatedness between individuals is a spontaneous phenomenon. The procedures of the studies reported in Chapters 2 and 4 may have seemed unnatural to the children. Because of this, it was seen to be important to examine whether these relationships would be found when symbolic play, affect and attention were allowed to vary naturally. However, it was unclear whether the rating scale developed to measure affective mood and attention-to-tasks was sensitive enough to detect such variation. A preliminary study (Chapter 5) involved the measurement of affective mood and attention-to-tasks in children with autism across three occasions, using the scale. Enough natural variation in affect and attention was detected by the rating scale to warrant further investigation of these relationships. This variation was observed both within-participants and between-participants.

The next study examined the relationships of affective mood, attention-to-tasks, and symbolic play in children with autism (Chapter 6). Significant relationships between composite symbolic play scores, affect scores and attention scores were found in the children with autism. In the controls, a relationship was found between composite symbolic play scores and affect scores, but no relationship

between attention scores and composite symbolic play scores was found.

However, these controls were children without autism who had general intellectual delay, not children in mainstreamed education. Because no symbolic play impairment was found in the autistic children in this study, the results were not conclusive evidence of the role of affect and attention in symbolic play in autism.

In the final study of this thesis (Chapter 7) the symbolic play test itself was proposed as an example of the 'relatedness triangle'. In this triangle, children with autism were hypothesised to (1) attend less to the adult with whom they are playing, and (2) demonstrate a symbolic play impairment. Although the children with autism looked at the experimenter's face significantly less than the controls, no symbolic play impairment was found. It was concluded that without corresponding symbolic play and social attention impairments, that the concept of a 'symbolic play relatedness triangle' could not be accepted on the basis of these results.

In relation to the examination of symbolic play, a number of methodological issues are apparent. First, there was a different control group (the controls in the latter study were more comparable to children with autism) from chapter 6 onward. Second, there were fewer test items and all items involved non-realistic toys in the study reported in chapter six than previously. Third, a ceiling effect was observed in chapter 6.

In the final study (Chapter 7) no differences were found in the symbolic play of children with autism and that of controls. Furthermore, although it might be argued that symbolic play scores approached ceiling in Chapter 6, this was certainly not the case in Chapter 7. Therefore, the question of whether autism involves an impairment in symbolic *generativity* or an impairment in symbolic play ability *per se* remains unclear. Contrary to studies such as that of Lewis and Boucher (1995) the

children with autism were not less able to generate symbolic ideas than children with general intellectual delay and no autism.

## 8.2 Methodological Issues

The nature of the measurements of symbolic play, as well as the measurements of affective mood, attention-to-tasks and social attention in the final study (Chapter 7), require careful consideration as methodological issues.

### 8.2.1 On the Nature of the Symbolic Play Measurements

The symbolic play tests were based on Leslie's (1987) categories as outlined in 1.2, for categorisation of a 'symbolic act'. The tests were based on the study by Lewis and Boucher (1988) for their structure. Lewis and Boucher (1988) suggested that impairments in spontaneous symbolic play could be either cognitive impairments or conative impairments. Because of this, the tests included in the present thesis were designed to examine three types of non-spontaneous symbolic play; elicited symbolic play, instructed symbolic play, and modelled symbolic play.

However, the inclusion of spontaneous symbolic play may have shown interesting contrasts between the children with autism and controls. For example, would the increase in the symbolic play of children with autism, brought about by instructions or elicitation, be linear in relation to that of controls? Or would the increase be more or less dramatic? Other research can answer these questions to some degree.

Jarrold, Boucher and Smith (1991) demonstrated a parallel increase in symbolic play in children with autism on the inclusion of elicitation and instructions, relative to controls.

A further issue concerns modelled symbolic play. Baron-Cohen (1987) pointed out that modelled play is little more than physical imitation. However, very little of the symbolic play demonstrated in this thesis followed modelling by the experimenter. The meaningful comparisons have been made between elicited symbolic play and instructed symbolic play, since it was important to address symbolic generativity.

It is also important to point out that other key studies of symbolic play actually included conditions entirely consisting of particular categories of symbolic play (e.g. Jarrold, Boucher and Smith, 1991; Lewis and Boucher, 1988). This approach to the measurement of symbolic play enjoys the advantage of avoiding the exclusion of play which is relatively uncommon in less structured situations, such as modelled play.

The reader must also bear in mind that the studies differed in terms of the number of toy items used. The first and second symbolic play studies (Chapters 2 and 4) included four realistic and four unrealistic toys. However, to avoid confusion with functional play, realistic toys were not used as test items in the later studies (Chapters 6 and 7). Also, in the final study (Chapter 7) toys were used in twos, three times over, in order to allow for counterbalancing. The results of the studies are still comparable, but they could have been more so with greater methodological consistency.

A very important issue is the lack of reliability testing of the symbolic play data. This seriously impairs the value of the findings. Future studies should include measurement of symbolic play by independent raters whose data is then tested for reliability. The affect and attention measures of Chapter 7 could be treated in the same way in future studies.

In sum, these studies suffer from considerable methodological problems as regards the data on symbolic play. Therefore, they should be treated with caution especially when comparisons are made between them. With hindsight, greater methodological consistency, and the inclusion of a spontaneous component to the play, may have produced results more consistent with current research (for a review of methodological issues in symbolic play research in autism, see Jarrold, Boucher and Smith, 1993).

### 8.2.2 On the Nature of the Affective Mood / Attention-to-tasks Rating Scale

The methodological issues concerning the use of the rating scale developed in Chapter 3 and used in Chapters 4, 5 and 6 should also be examined. The rating scale was originally conceived to address the anecdotal evidence of professionals (teachers and educational assistants) that mood and attention varied from day to day in children with autism. This was borne out in Chapter 5, although variation also differed between children. The scale was especially useful in detecting a relationship between symbolic play scores and rated attention-to-tasks in the children with autism.

The major qualification of the scale is that it addressed only very specific forms of affect and attention, and then only from the perspective of others on the child. As such, it only really measured the affect and attention which others could perceive. On the other hand, the other is a very important element of the relatedness triangle, and it is of course problematic to ask children with autism to report how they are feeling.

We can say that the scale was useful in that it examined the perceptions of important 'lay experts'; the professionals who care for children with autism (Chapters 5 and 6). It was also used successfully by raters unfamiliar with autism (Chapter 4). It

would also be interesting to examine the perceptions of other important individuals such as parents and siblings.

### 8.2.3 On the Nature of the Measure of Social Attention

The measure of social attention, or more specifically, 'referential looking', enjoys a relative objectivity when compared with the rating scale. Whilst not being completely objective (lacking precision beyond half-seconds) these results can be considered robust. They are also very comparable to the findings of previous studies of joint-attention behaviours, studies which also included play (e.g. Mundy, Sigman and Kasari, 1990; Mundy, Sigman, Ungerer and Sherman, 1986, 1987; Sigman, Mundy, Sherman and Ungerer, 1986).

### 8.2.4 On the Choice of Language Tests

It was important to assess the language of the children carefully. Recently it has become clear that the vocabulary of children with autism can far exceed their grammatical understanding of language and comprehension of meaning (c.f. Jarrold, Boucher and Smith, 1993). Certain tests such as the British Picture Vocabulary Scale (BPVS) are problematic for this reason.

The Test for the Reception of Grammar (TROG; Bishop, 1983) was useful because it does not require vocalisation by the subject in order to answer. It simply requires the ability to point at the correct picture out of four presented, which matches a statement made by the tester. Thus, TROG measures a person's *receptive* language ability.

For the purposes of perspective, the Renfrew Action Picture Test (Renfrew, 1966) was also administered in the studies reported in chapter six and seven, in order to



test *expressive* language ability. This test includes two scores, one being constructed from the child's demonstration of vocabulary, the other from the correct use of grammar. These scores should be considered secondary to the receptive language age equivalences suggested by TROG. They are useful because they demonstrate that the children with autism did not differ significantly from the controls' expressive language scores.

#### 8.2.5 Other Methodological Issues

Some work was carried out with the intention of inclusion in this thesis, which could not be included in the event. A further chapter was to be included which described a further analysis of the final study. The chapter was to entail a re-analysis of the videotapes of the symbolic play sessions reported in Chapter 7. In this re-analysis, independent raters marked the sessions 1-2-3 in terms of the child's 'positive affective mood' and 'attention to the task and experimenter', with 1 being the session where they showed the most of each quality, and 3 being the session where they showed the least of each quality. Unfortunately, inter-rater reliability was too poor to include the results in the thesis. This work had been very labour-intensive. It required many hours of careful video editing for counterbalancing of presentation of the different occasions to the raters. It also included recruitment and organisation of payment of the raters, as well as the rating itself. Four months were spent engaged in this work, which in the end could not be included. It was the single most time-consuming study of the thesis.

Furthermore, the poor inter-rater reliability of this unreported study might cast doubt on the validity of the earlier rating scale. Reliability was generally satisfactory, but it may be that another phenomenon than affect or attention was measured, such as co-operativeness. On the other hand the findings of chapter 3 would stand against this.

There is also a current issue in the diagnosis of autism, which may be relevant. In the autistic children included in this thesis, all of the children had received a formal Statement of Special Educational Needs including some mention of autism, with psychiatric advice indicating autistic features consistent with DSM-III-R (APA, 1987) criteria. The children were seen in the Birmingham and Stoke-on-Trent areas of the UK, where Local Authority practice involves the provision of specialist provision for autistic children. However many Local Authorities do not accept that autistic children require specialist provision, and instead aim to integrate these children rather than place them in autistic schools (as in Birmingham) or in autistic units within special schooling (as in Stoke). Authorities aiming for integration are less concerned about whether psychiatric diagnosis is or is not made. It is beyond the aims of this thesis to attempt to resolve the question about diagnosis of autism, except to say that the children examined had received such a diagnosis.

A final methodological issue is the loss of subjects through the use of language tests. Although at least ten children with autism were included in each of the studies, six were lost from the study reported in Chapter 4, four were lost in the study reported in Chapter 6 and eight were lost in the study reported in Chapter 7 (and two more to ensure close compatibility of the groups). In each case, children were at first recommended by their teachers as 'at about the four year level in receptive language', but on completion of the TROG the children did not reach four years' age equivalence. This may have been due to their unrepresentative competence in vocabulary, which has already been mentioned in 8.2.4.

### 8.3 Theoretical Implications of the Studies

Now that methodological considerations of the empirical studies have been clarified, it is possible to outline their theoretical implications, and how these relate to other research. It will be seen that the findings of this thesis are limited by the methodological issues described above.

The evidence of a social-affective-attentive disorder in autism presented in this thesis is unconvincing. A musical stimulus was found to influence the symbolic play of children without autism by increasing the number of symbolic responses overall, and increasing the number of generative symbolic responses. It was argued that a perception of the social significance of the musical stimulus could account for these results. This finding is also interesting because it was not found in the children with autism in chapter four.

Affective mood and attention-to-tasks correlated with the composite symbolic play scores of the children with autism in both chapter 4 and chapter 6. This might indicate a degree of interdependence of these factors in children with autism. However as evidence of affective and attentive factors in symbolic play, these results are compromised by the lack of a corresponding symbolic play impairment in chapter 6.

In chapter 7 there were fewer instances of 'referential looking' in children with autism than in controls. This result is in line with those reported in studies of joint-attention carried out by Mundy, Sigman and colleagues. Again however, the result is compromised by a lack of a corresponding symbolic play impairment. Furthermore, no relationships were found between the 'referential looking' variable and composite symbolic play score.

Therefore only very limited evidence was found to support the introduction of affective and attentive factors into models of symbolic play in autism. The original questions posited at the beginning of the thesis were:

- *Can music influence symbolic play-and is this different in autism?*

There was some evidence that music can influence symbolic play. However, there was a lack of statistical interaction between condition and group in chapter 4, and so the evidence that autistic children are different in this regard is tenuous.

- *Do certain affective / attentive variables relate to symbolic play differently in autistic and non-autistic children?*

This question could not be adequately answered because of the failure to detect corresponding symbolic play impairments in chapter 6 (and chapter 7). However, some evidence was found to suggest that affect and attention might be related to symbolic play in children with autism - but this did not comprise evidence that we should adopt an interpersonal approach to autism.

- *Are specific kinds of non-spontaneous play specifically impaired in autism?*

The evidence for a generativity impairment was poor; it was only observed in chapter 4. It was not seen in chapters 6 and 7. The question could not be adequately answered, although other research suggests that a generativity impairment does indeed exist in autism<sup>5</sup> (Lewis and Boucher, 1995, 1988).

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<sup>5</sup> Lewis and Boucher (1995) report that some of the generativity impairment can be overcome to some extent using a single toy and non-representational material. Therefore even generativity impairment may involve more than ability.

- *Is there less referential looking from child to experimenter in children with autism while they are playing with him?*

There was no evidence of corresponding symbolic play and social attention impairments in chapter 7, although the children with autism did look at the experimenter less often than the controls on two out of three occasions. If social attention and symbolic play are necessarily linked, why would one be impaired and the other not?

#### 8.4 Overall Implications for the Theories

Given the unconvincing results of the empirical studies, which theory should we adopt in explaining the symbolic play of autistic children? As we saw in 1.8 and 1.9, there is uncomfortable evidence for both. As far as the metarepresentational theory is concerned, why should blind children show autistic features, why should structuring symbolic play improve it when it supposed to be cognitively impaired, and why does mental state understanding not improve in this way? As far as the interpersonal relatedness concept is concerned, why should results about emotion perception be ambiguous, and why should the basic impairment of autism not be cognitive, as Baron-Cohen (1994) has proposed?

Nevertheless, a strength of the theory of mind approach is that there is an ever-growing body of evidence that understanding of mental states is very poor in children with autism, and this does seem to constitute a specific delay in ability. There have not been any studies showing that knowledge of mental states can be effectively taught to autistic people. Even if we accept Perner's (1993) advice and do not include symbolic play in truly metarepresentational abilities, there is more than enough research to support a theory of mind impairment in autism.

Similarly, Hobson's approach, summarised in Hobson (1993) enjoys enough support from various research programmes to continue at least for the moment as a separate research programme. There are simply too many authors, not necessarily communicating with each other, suggesting that relatedness of one form or another contributes to symbolic development - particularly, the evidence from communication therapy, blind children, and the ability of autistic people to shift between vision and audition.

The research has not stayed static. Possibly under the pressure of alternative views such as those of Tantam (1992) and Rogers and Pennington (1991), Baron-Cohen's *model of the mindreading system* (1994) is in fact an integrative effort. It contains parallel systems, any of which might result in autism if damaged. The ToMM (Theory of Mind Mechanism), SAM (Shared Attention Mechanism) and EDD (Eye Direction Detector) are all hypothesised to be basic mental structures. Therefore, Baron-Cohen suggests implicitly that there are in fact basic affective and cognitive pathways to autism, provided that we accept that the SAM and the EDD are more 'affective' than the ToMM. Previously, Hobson (1993) had stated that the basic difference between his own thesis and that of Leslie (1987) was that Leslie proposed that the symbol structures came first and the knowledge of mental states second, with Hobson proposing the opposite.

"[Leslie's] 'decoupling mechanism' is innate; it does not develop through social experience; it has nothing to do with feelings; it leads to (rather than derives from) the ability to recognise the nature of mental states."

(Hobson, 1993, p.208)

Baron-Cohen might still hold that these things are true within the ToMM, but not necessarily for the EDD and the SAM. Therefore, Baron-Cohen's (1994) account of autism implies both affective and social bases for symbolic life, and autism. We

could consider that this leaves the old opposition of Hobson (1993) and Leslie (1987) rather redundant.

### 8.5 Conclusions

On the basis of the results presented here, it is not possible to adopt the interpersonal approach in explaining the symbolic play of autistic children. Some evidence was found of an effect of music on the symbolic play of non-autistic children. There was also some tenuous evidence that symbolic play, affect and attention might be interdependent in autistic children. Evidence of symbolic play impairment was not found consistently, casting doubt on the other findings presented. Finally, there was less referential looking by children with autism while they were playing, but this was not found to be related to their symbolic play.

Methodological issues, particularly the failure of the studies to detect a symbolic play impairment, cast doubt on the other findings. The importance of methodological issues in studies of symbolic play in autistic children has been highlighted by Jarrold et al. (1993).

Both the theory of mind approach and the interpersonal relatedness approach have encountered uncomfortable evidence but also considerable empirical support, so neither can be convincingly discounted on the basis of published evidence, and certainly not by the evidence presented here.

Finally, we might argue that accounts of autism are becoming more integrative, including both affective and cognitive elements in their proposed mechanisms (e.g. Baron-Cohen, 1994; Rogers and Pennington, 1991).

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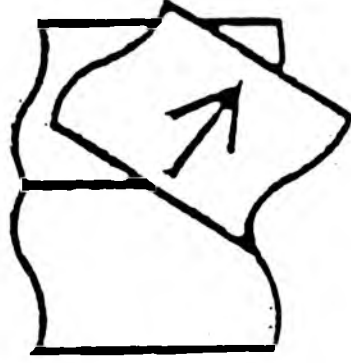
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## Appendix 2.1.

## Full Instructions for Items in the Performance Task (Chapters 2 and 4)

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*Realistic Toys*

- (1) brush - 'Show me the brush cleaning the floor'
  - (2) pickup truck - 'Show me the truck towing the car'
  - (3) spoon - 'Show me how you eat some soup'
  - (4) cow - 'Show me how the cow eats the grass'
  - (5) car - 'Show me how the car drives along the road'
  - (6) gate - 'Show me how the cow goes through the gate'
  - (7) bowl - 'Show me how to stir the rice pudding'
  - (8) motorbike - 'Show me how the motorbike races away'
- 

*Nonrealistic Toys*

- (1) blocks - 'Show me how the carpark is made for the car to park in/  
dolly makes a seat'
- (2) rubber - 'Show me how the car stops at the ramp/dolly holds her  
case'
- (3) counter - 'Show me how the car goes around the roundabout/dolly  
rolls the hoop'
- (4) box - 'Show me how the car goes into the garage/dolly goes in and  
out of the rain'
- (5) stick - 'Show me how the car crashes into the barrier/dolly holds the  
flag'
- (6) foil - 'Show me how the car/dolly slips on the ice'
- (7) felt - 'Show me how the car travels down the road/dolly walks  
down the path'
- (8) playdough - 'Show me how the car/dolly gets stuck in the mud'

## Appendix 2.2 One-Way Repeated-Measures ANOVA analyses for Study 1

	MS	df	F	p
Elicited symbolic play	18.8	1	31.3	0.0
Error	0.6	17		
Instructed symbolic play	2.2	1	0.9	0.2
Error	1.1	17		
Modelled symbolic play	1.8	1	4.9	0.1
Error	0.4	17		
Elicited non-symbolic play	10.0	1	5.2	0.1
Error	1.9	17		
Instructed non-symbolic play	0.1	1	0.2	0.7
Error	0.1	17		
Instances of no response	1.9	1	3.8	0.1
Error	0.4	17		

Appendix 3.1 Affect/Attention Rating Scale

Name..... Date.....

Completed by.....

- |  |             |
|--|-------------|
| 1. The child looks to be 'in good mood'.                     | SD D N A SA |
| 2. The child looks sad.                                      | SD D N A SA |
| 3. The child is not enjoying the task.                       | SD D N A SA |
| 4. The child is engaged happily in the task.                 | SD D N A SA |
| 5. The child is 'having a good time'.                        | SD D N A SA |
| 6. The child looks fed up.                                   | SD D N A SA |
| 7. This child is simply happy.                               | SD D N A SA |
| 8. The child seems content to play with the toys.            | SD D N A SA |
| 9. The child seems discontented.                             | SD D N A SA |
| 10. The child looks unhappy enough to want to stop.          | SD D N A SA |
| 11. The child seems interested in what s/he is shown.        | SD D N A SA |
| 12. The child is spending all his/her time on the game.      | SD D N A SA |
| 13. The game is not holding the child's attention.           | SD D N A SA |
| 14. The child is being easily distracted.                    | SD D N A SA |
| 15. The child is absorbed in the game.                       | SD D N A SA |
| 16. The child is doing what s/he is asked immediately.       | SD D N A SA |
| 17. The child looks as if s/he would prefer to be elsewhere. | SD D N A SA |
| 18. The child is being very attentive.                       | SD D N A SA |
| 19. The child is not concentrating on the task.              | SD D N A SA |
| 20. The child is not following the instructions carefully.   | SD D N A SA |

## Appendix 4.1 Analyses of Variance of Condition by Group for Play

	MS	df	F	p
<b>Elicited Symbolic Play</b>				
Group (between-subjects)	27.7	1	4.0	0.06
Error	6.9	24		
Condition (within-subjects)	3.8	1	2.3	0.1
Interaction	0.7	1	0.4	0.5
Error	1.6	24		
<b>Instructed Symbolic Play</b>				
Group	0.6	1	0.3	0.6
Error	2.4	24		
Condition	0.1	1	0.0	0.8
Interaction	0.7	1	0.3	0.6
Error	2.3	24		
<b>Modelled Symbolic Play</b>				
Group	0.8	1	0.1	0.8
Error	1.2	24		
Condition	0.7	1	0.8	0.4
Interaction	1.2	1	1.3	0.3
Error	0.9	24		
<b>Elicited Non-symbolic Play</b>				
Group	1.9	1	0.2	0.6
Error	7.6	24		
Condition	0.3	1	0.1	0.7
Interaction	0.0	1	0.0	1.0
Error	2.6	24		
<b>Instructed Non-symbolic Play</b>				
Group	3.2	1	1.1	0.3
Error	2.8	24		
Condition	5.6	1	3.5	0.1
Interaction	0.2	1	0.1	0.7
Error	1.6	24		
<b>Modelled Non-symbolic Play</b>				
Group	0.0	1	0.0	0.9
Error	0.7	24		
Condition	1.6	1	2.1	0.2
Interaction	0.2	1	0.2	0.6
Error	0.7	24		
<b>Instances of No Response</b>				
Group	17.3	1	5.6	0.03
Error	3.1	24		
Condition	0.7	1	0.7	0.3
Interaction	0.3	1	0.5	0.5
Error	0.6	24		

Appendix 5.1 Rating Scale for Attention and Affect Day-to-Day Variation

Teacher / Rater ..... Student ..... Trial 1/2/3

(SD = strongly disagree, D = disagree, N = neither, A = agree, SA = strongly agree)

- |  |             |
|--|-------------|
| 1. The child has been 'in a good mood' today.                      | SD D N A SA |
| 2. The child has been sad today.                                   | SD D N A SA |
| 3. The child has not enjoyed today's tasks.                        | SD D N A SA |
| 4. The child has been engaged happily today's tasks.               | SD D N A SA |
| 5. The child has been 'having a good time' today.                  | SD D N A SA |
| 6. The child has seemed fed up today.                              | SD D N A SA |
| 7. This child has been simply happy.                               | SD D N A SA |
| 8. The child seems content today.                                  | SD D N A SA |
| 9. The child seems discontented today.                             | SD D N A SA |
| 10. The child looks too unhappy to participate today.              | SD D N A SA |
| 11. The child has been interested in what s/he has been shown.     | SD D N A SA |
| 12. The child has been spending all his/her time on today's tasks. | SD D N A SA |
| 13. Today's tasks are not holding the child's attention.           | SD D N A SA |
| 14. The child has been easily distracted today.                    | SD D N A SA |
| 15. The child has been absorbed in today's activities.             | SD D N A SA |
| 16. The child has been doing what s/he is asked immediately.       | SD D N A SA |
| 17. The child looks as if s/he would prefer to be elsewhere.       | SD D N A SA |
| 18. The child has been very attentive today.                       | SD D N A SA |
| 19. The child has been not concentrating today.                    | SD D N A SA |
| 20. The child has not been following instructions carefully today. | SD D N A SA |
- Please mark on the following line how you think the child's mood has been overall;
- Negative mood \_\_\_\_\_ Positive Mood

Appendix 6.1 Full Instructions for the Play Task (Chapter 6)

- (1) blocks-'Show me how teddy makes a table with the blocks'
- (2) rubber-'Show me how teddy reads the book'
- (3) tubular plastic-'Show me how teddy has a drink'
- (4) short stick-'Show me how teddy waves the flag'
- (5) felt-'Show me how teddy walks along the road'
- (6) playdough-'Show me how teddy sticks in the mud'



## Appendix 6.2 One-Way ANOVA Analyses of Group Differences in Play for Study 4

	MS	df	F	p
Elicited symbolic play	0.0	1	0.2	0.7
Error	1.9	24		
Instructed symbolic play	0.0	1	0.0	1.0
Error	1.2	24		
Modelled symbolic play	1.1	1	1.1	0.3
Error	0.0	24		
Elicited non-symbolic play	3.6	1	1.0	0.3
Error	3.6	24		
Instructed non-symbolic play	0.1	1	0.5	0.5
Error	0.1	24		
Modelled non-symbolic play	0.4	1	1.2	0.3
Error	0.4	24		
Instances of no response	3.6	1	0.9	0.4
Error	4.0	24		

Appendix 7.1 Full Instructions for the Play Task (Chapter 7)

- (1) blocks-'Show me how teddy makes a table with the blocks'
- (2) makes a seat
- (3) makes a bridge
- (4) tubular plastic-'Show me how teddy has a drink'
- (5) looks through
- (6) wears the hat
  
- (7) rubber-'Show me how teddy reads the book'
- (8) carries the tray
- (9) eats the chocolate
- (10) felt-'Show me how teddy walks along the road'
- (11) sleeps under his blanket
- (12) wears his coat
  
- (13) short stick-'Show me how teddy waves the flag'
- (14) writes with the pen
- (15) climbs the tree
- (16) playdough-'Show me how teddy sticks in the mud'
- (17) eats the cake
- (18) kicks the ball

Appendix 7.2 By-Group Friedman Two-Way Analyses for the Effects of Occasion  
on All Variables

<i>Autism Group</i>		
<u>Variable</u>	<u>Friedman Test Statistic</u>	<u>probability</u>
Elicited Symbolic Play	0.15	0.928
Instructed Symbolic Play	3.75	0.153
Modelled Symbolic Play	0.00	1.000
Elicited Nonsymbolic Play	0.20	0.905
Instructed Nonsymbolic Play	0.60	0.741
Modelled Nonsymbolic Play	1.95	0.377
Instances of No Response	0.95	0.622
Number of Seconds Attending to Experimenter	3.80	0.150
Background Variables:		
Number of Smiles	3.75	0.153
Number of Seconds Smiling	3.95	0.139
Number of Seconds Attending to Toy	1.85	0.397
Number of Seconds Attending Elsewhere	0.60	0.741

Appendix 7.2 (contd.) By-Group Friedman Two-Way Analyses for the Effects of  
Occasion on All Variables

<i>Control Group</i>		
<u>Variable</u>	<u>Friedman Test Statistic</u>	<u>probability</u>
Elicited Symbolic Play	0.95	0.622
Instructed Symbolic Play	0.65	0.723
Modelled Symbolic Play	0.00	1.000
Elicited Nonsymbolic Play	1.40	0.497
Instructed Nonsymbolic Play	0.00	1.000
Modelled Nonsymbolic Play	0.15	0.928
Instances of No Response	0.45	0.799
Number of Seconds Attending to Experimenter	0.95	0.622
Background Variables:		
Number of Smiles	3.05	0.218
Number of Seconds Smiling	0.60	0.741
Number of Seconds Attending to Toy	3.65	0.161
Number of Seconds Attending Elsewhere	2.15	0.341

## Appendix 7.3 Two-way ANOVA analyses of Occasion by Group for Play (Study 5)

Variable	MS	df	F	p
<i>Seconds Attending to Experimenter</i>				
Group (between-subject)	476.0	1	9.99	<b>0.01</b>
Error	47.6	18		
Occasion (within-subject)	62.5	2	2.4	0.1
Interaction	80.5	2	3.1	0.1
Error	25.9	36		
<i>Elicited Symbolic Play</i>				
Group	8.1	1	1.5	0.2
Error	5.3	18		
Occasion	1.3	2	1.1	0.3
Interaction	0.2	2	0.2	0.8
Error	1.2	36		
<i>Instructed Symbolic Play</i>				
Group	4.3	1	1.4	0.3
Error	3.2	18		
Occasion	1.4	2	1.3	0.3
Interaction	1.3	2	1.1	0.3
Error	1.1	36		
<i>Modelled Symbolic Play</i>				
Group	0.6	1	0.9	0.4
Error	0.7	18		
Occasion	0.1	2	0.1	0.9
Interaction	0.4	2	0.7	0.5
Error	0.5	36		

## Appendix 7.3 (contd.)

*Elicited Non-Symbolic Play*

	MS	df	F	p
Group	4.3	1	3.9	0.1
Error	1.1	18		
Occasion	0.2	2	0.4	0.7
Interaction	0.5	2	0.9	0.4
Error	0.6	36		

*Instructed Non-Symbolic Play*

Group	0.4	1	1.5	0.2
Error	0.3	18		
Occasion	0.1	2	0.3	0.8
Interaction	0.1	2	0.3	0.8
Error	0.4	36		

*Modelled Non-Symbolic Play*

Group	0.3	1	1.9	0.2
Error	0.1	18		
Occasion	0.5	2	3.0	0.1
Interaction	0.3	2	1.7	0.2
Error	0.2	36		

*Instances of No Response*

Group	2.0	1	1.0	0.3
Error	2.0	18		
Occasion	0.4	2	0.6	0.5
Interaction	0.8	2	1.4	0.2
Error	0.6	36		

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